EPSON® SCANNING UTILITIES

EPSON TWAIN • EPSON Scan! II User's Guide

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Introduction

The EPSON® Scanning Utilities let you perform the following functions with your EPSON scanner:

- ❏ Read images in color, grayscale, or black-and-white, and save the scanned images to disk as a file
- ❏ Convert the image files to various formats so you can use them with your application software
- ❏ Calibrate your scanner to your monitor and your printer
- ❏ Capture scanned images from within your application
- ❏ Automatically locate, expose, and scan an image
- ❏ Adjust individual settings and preview the effects before you scan
- ❏ Choose single- or triple-pass scanning
- ❏ Save and reuse scanning settings that work well in your environment
- ❏ Use the automatic area segmentation and text enhancement technology features built into some EPSON scanners
- ❏ Scan transparencies and slides and scan negative film into positive photo images (with scanners that have a transparency unit)
- ❏ Take advantage of the multipage scanning feature available with scanners that have an automatic document feeder (ADF).

The Scanning Utilities include two integrated programs:

- ❏ EPSON Scan! II32 and EPSON TWAIN32 (for 32-bit scanning with Microsoft® Windows® 95 or Windows NT®)
- ❏ EPSON Scan! II and EPSON TWAIN (for 16-bit scanning with Windows 3.1).

Note:
This guide refers to the 32-bit programs as EPSON Scan! II and EPSON TWAIN to reduce confusion.

EPSON Scan! II calibrates your scanner with your monitor and color printer to produce images whose colors match the originals. It can also capture images and then save and export them in a variety of file formats.

EPSON TWAIN is the interface between most of your software and your scanner. The interface has two screens: easy and advanced. To take advantage of your scanner's features, you can access either screen from within any software that supports the TWAIN standard or from EPSON Scan! II.

Note*:*
The top line of the screen identifies whether you are using EPSON Scan! II or EPSON TWAIN.

System Requirements

For the EPSON Scanning Utilities to work properly, your system must have at least the following configuration:

- ❏ One of the following EPSON scanners:

  ES-600C
  ES-800C
  ES-1000C
  ES-1200C
  Expression™ 636
  ActionScanner™ II

  Some features are not available or are restricted for some scanners.

- ❏ A 486-based (or higher) IBM® compatible computer or an IBM PS/2®

- ❏ DOS 5.0 or higher

- ❏ Microsoft Windows 95, Windows 3.1x, Windows for Workgroups 3.1x, or Windows NT 3.5x or higher

  Note:
  To use 32-bit scanning features, your system must be running Windows 95 or Windows NT.

- ❏ A bidirectional parallel interface (either the standard bidirectional parallel interface or a PS/2 standard printer port) or an Adaptec® SCSI adapter

  Note:
  ❏ *EPSON supports some Adaptec-compatible SCSI adapters.*

- ❏ *If you do not have Windows 95 or Windows NT and you are using an Adaptec SCSI adapter, you need to install the Adaptec EZ-SCSI software, as described in your Adaptec documentation.*

- ❏ Video Graphics Array (VGA) or higher monitor

  Note:
  The quality of color or tone reproduction depends on the display capability of your computer system, including the video controller, monitor, and software.

- ❏ At least 50MB of free hard disk space for scanner applications and images

- ❏ At least 8MB of available RAM (more for Windows 95).

How to Use This Manual

This *User's Guide* contains information you need to install and use the EPSON Scanning Utilities with your EPSON scanner.

Chapter 1 describes installing your EPSON Scanning Utilities software. Be sure to read this first. **Chapter 2** describes how to calibrate your system. **Chapter 3** provides basic information on how to scan from within your application. **Chapter 4** describes using the special effects features of your software. **Chapter 5** tells you how to use EPSON Scan! II to work with images. **Chapter 6** contains troubleshooting tips, and **Appendix A** lists the software's default settings. **Appendix B** provides information on the scanner settings for the Expression 636.

This manual also includes two glossaries—an **icon glossary** that describes how each icon works, and a **term glossary** that describes common scanning terms. The **index** helps you find needed information quickly.

Cautions, Tips, and Notes

This manual displays important information as follows:

Cautions
should be followed carefully to ensure your scanner operates correctly.

Tips
contain helpful ideas for using these utilities.

Notes *contain important information about these utilities.*

Where to Get Help

EPSON provides customer support and service through a network of Authorized EPSON Customer Care Centers. Dial **(800) 922-8911** for the nearest location or the following services:

- ❏ Fax-on-Demand access to EPSON's technical information library
- ❏ Literature on current and new products
- ❏ The location of your nearest Authorized EPSON Reseller or Customer Care Center
- ❏ Technical information on installation, configuration, and operation of EPSON products
- ❏ Customer relations.

For answers to commonly asked questions about EPSON products 24 hours a day, 7 days a week, call EPSON Sound Advice at **(800) 442-2110**.

You can purchase manuals, accessories, or parts from EPSON Accessories at **(800) 873-7766** (U.S. sales only). In Canada, please call **(800) 463-7766** for dealer referral**.**

If you need help using software with an EPSON product, see the documentation for that program for technical support information.

Electronic Support Services

You can access helpful tips, specifications, notes, DIP switch or jumper settings, drivers, FAQs, sample files, application notes, and EPSON product bulletins 24 hours a day, 7 days a week, using a modem and one of the online services below.

World Wide Web

From the Internet, you can reach EPSON's Home Page at **http://www.epson.com**.

EPSON Internet FTP Site

If you have Internet FTP capability, use your Web browser (or other software for FTP downloading) to log onto **ftp.epson.com** with the user name anonymous and your E-mail address as the password.

EPSON Download Service

You can call the EPSON Download Service BBS at **(800) 442-2007.** Set your communications software to 8 data bits, 1 stop bit, no parity. Modem speed can be up to 28.8 Kbps.

EPSON Fax-on-Demand Service

You can access EPSON's technical information library by calling **(800) 442-2110** or **(800) 922-8911** and selecting the appropriate phone option. You must provide a return fax number to use Fax-on-Demand.

EPSON Forum on CompuServe®

Members of CompuServe can type GO EPSON at the menu prompt to reach CompuServe's Epson America Forum. As an owner of an EPSON product, you are eligible for a free introductory CompuServe membership, which entitles you to an introductory credit, and your own user ID and password. To take advantage of this offer in the U.S. or Canada, call **(800) 848-8199** and ask for representative #529.

Chapter 1

Installing Your Software

The EPSON Scanning Utilities come with installer software that makes them easy to install with Windows 95 or Windows 3.1.

Getting Ready to Install Your Software

Before you install the EPSON Scanning Utilities, make sure you have set up your scanner and connected it to your computer as described in the *User's Guide* that comes with your scanner. If you are using a SCSI interface, make sure the interface settings—such as the SCSI IDs and terminators—are set properly, and that you installed the SCSI software if necessary.

You must install the EPSON Scanning Utilities as described in the next section before you use your scanner. It is also best to install the EPSON Scanning Utilities before you install your application software. Check that you have the two 3.5-inch diskettes that come with the scanner and contain the EPSON Scanning Utilities (EPSON Scan! II, EPSON TWAIN, the calibration utilities, and other related files). It is best to make backup copies of the diskettes, work with the copies, and keep the original diskettes in a safe place. (To make backup copies, see your computer or operating system manual.)

After you install the EPSON Scanning Utilities, you can calibrate your system as described in Chapter 2. Then install your application software by following the instructions in the application's documentation.

Installing the Scanning Utilities

Follow the steps below to install the EPSON Scanning Utilities for Windows 95, Windows NT, Windows 3.1, or Windows for Workgroups 3.1. The installer program automatically detects your operating system and installs 32-bit or 16-bit files as necessary.

Note: *For Windows NT 4.X, follow the Windows 95 instructions. For Windows NT 3.5X and Windows for Workgroups, follow the Windows 3.1 instructions.*

1. Start Windows 95 or Windows 3.1.

   Note for Windows 95 SCSI users:
   After you connect your scanner to your computer, you see the screen below when you install or start Windows 95, or when you select Add New Hardware *in the Control Panel.*

Choose Do not install a driver *and click OK. You do not need to install EZ-SCSI, even if you are using an Adaptec SCSI card, if the card is already set up. See your Adaptec documentation for instructions on how to set up this card. If you are using a bidirectional card, you only need to install the card—no software configuration is needed.*

2. Insert the EPSON Scan! II program diskette 1 in a diskette drive.

3. From Windows 95, click Start and then Run.

   From the Windows 3.1 Program Manager, open the File menu and select Run.

4. Type A:\SETUP (or B:\SETUP if you inserted the diskette in drive B) and click OK. After a few moments, you see the initial setup screen.

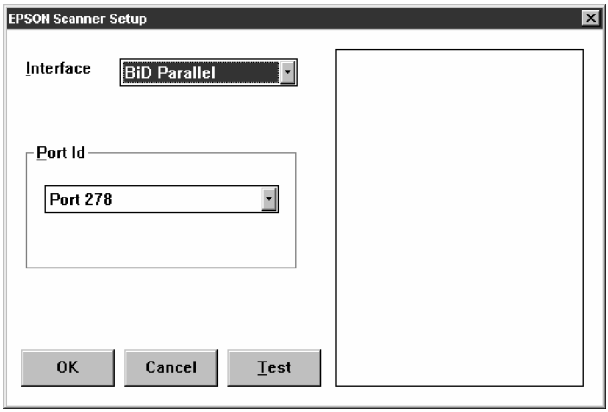
5. Click OK to continue. A dialog box displays the path in which the installer software will install the EPSON Scan! II program. The default path is C:\EPSCAN32 for Windows 95 or C:\EPSCAN2 for Windows 3.1.

6. Click OK to accept the default pathname, or enter a new path and click OK.

7. The next dialog box displays the path in which the installer software will install the EPSON TWAIN program. The default path is C:\WINDOWS. Click OK to accept the default pathname, or enter a new path and click OK.

8. The installer software copies the Scanning Utilities to your hard disk drive and prompts you for diskette 2 when necessary.

9. After a few moments, you see the EPSON Scanner Setup dialog box.



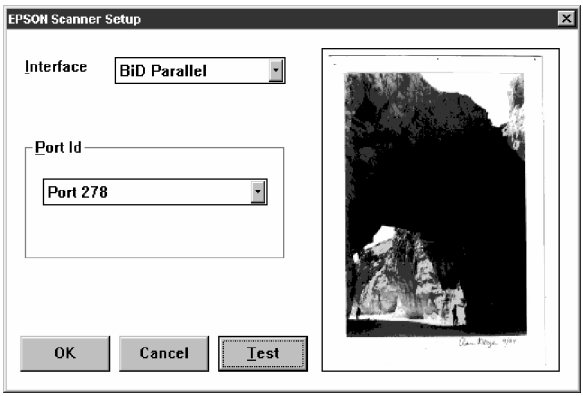
From the Interface pull-down menu, choose SCSI if your scanner is connected to a SCSI interface or BiD Parallel if it is connected to a bidirectional parallel interface.

10. If necessary, select the port ID of the interface board from the Port ID pull-down menu. Normally, you do not need to change the default port ID setting. If the scanner is connected to a SCSI interface, the port ID is selected automatically. If the scanner is connected to a parallel interface, select the port ID of the interface: port 378 is your computer's built-in parallel port (lpt1) and port 278 is the port on a bidirectional parallel card installed in your computer (lpt2).

Note:
If you selected SCSI from the Interface menu and no SCSI ID number appears, make sure no other SCSI device has the same ID number as the scanner.

11. Now test your scanner. Turn the scanner on and raise the cover. Place an image face down on the glass surface. Then carefully close the cover.

12. Click the Test button. If the scanner, interface, and EPSON Scanning Utilities are set up correctly, the scanner scans the image. After a few moments, you see the image in the EPSON Scanner Setup dialog box, as shown below.



Photograph by Claire Bergen

13. Click OK to close the EPSON Scanner Setup dialog box.

14. Remove the EPSON Scan! II program diskette from the drive.

15. If you are using Windows 3.1, exit Windows and then restart it.

The installer creates an EPSON Scanner program group or folder in Windows.

Before you can acquire an image from within your application for the first time, you need to select EPSON Scanners as your TWAIN data source; see your application documentation for instructions.

Chapter 2

Calibrating Your System

Sometimes the colors of your original image do not match the colors you see on your screen and in the final printed output. This is because of the different color processes your scanner, monitor, and printer use to produce color.

The scanner and the monitor both create a range of colors by adding red, green, and blue in different proportions and intensities (an additive color process). Printers, on the other hand, produce colors by combining cyan (C), magenta (M), yellow (Y), and black (K) inks (CMYK) to create the desired hues. This is a subtractive color process.

When you print a scanned image, the image goes through both the additive and subtractive interpretive processes to acquire color—the first when it is scanned, and the second when it is printed on your color printer. As a result, the printed colors may not match the colors in the original.

Calibration allows you to fine-tune your scanner, monitor, and printer to produce colors that are very close to those in the originals. Use the procedures in this chapter to:

- ❏ Calibrate your monitor to your scanner
- ❏ Calibrate your printer to your scanner
- ❏ Use the calibration profiles when you scan an image.

Calibrating Your Monitor to Your Scanner

To calibrate your monitor, you must first perform a screen calibration using EPSON Scan! II, and then enable screen calibration in TWAIN.

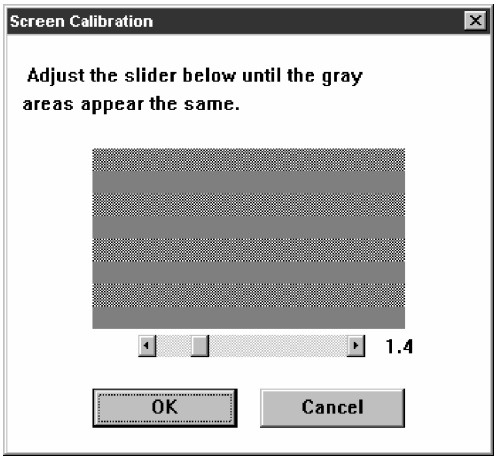
Performing Screen Calibration

Follow these steps to perform a screen calibration:

1. From Windows 95, click the Start button, point to Programs, point to EPSON Scanner, and then click EPSON Screen Calibration.

   From the Windows 3.1 Program Manager, double-click the EPSON Screen Calibration icon in the EPSON Scanner program group.

   You see this screen:



2. Look at the display from a distance and adjust the slide bar until the separate rows have the same basic color intensity.

***Tip**:*
If the rows don't look the same after you adjust the slide bar, increase the number of colors your monitor displays using Windows 95 Display or Windows 3.1 Setup. See your Windows documentation or online help for more information.

4. Click OK. Your setting is automatically saved as a new screen calibration profile.

If you use a different monitor or change your video display resolution, calibrate your screen again.

Enabling Screen Calibration

Once you have calibrated your screen, you need to make sure screen calibration is enabled. Follow these steps:

1. Start EPSON Scan! II, if necessary.

2. From the File menu, choose Acquire. You see the TWAIN screen.

   If the screen is fairly small and has an Advanced button, it is the easy screen (pictured on page 3-3). Click Advanced to switch to the advanced screen. If the screen is large and has a Configuration button, it is the advanced screen (pictured on page 3-3).

3. Click Configuration to open the Configuration dialog box.

4. Make sure the Enable Screen Calibration checkbox is selected. If it isn't, select it to enable screen calibration.

5. Click OK.

6. Close the EPSON TWAIN screen.

When screen calibration is enabled, TWAIN uses it as it scans images until you change this setting.

Calibrating Your Printer to Your Scanner

If you print color images, you must choose or create a calibration profile for each color printer you use. Using printer calibration profiles ensures that printed colors closely match the colors of the original image.

If you have one of these EPSON Stylus™ ink jet printers, EPSON Scan! II provides printer calibration profiles for you so you do not have to create them:

EPSON Stylus COLOR	Stylus 1500
EPSON Stylus COLOR II	Stylus COLOR 500
EPSON Stylus COLOR IIs	Stylus COLOR 200
EPSON Stylus Pro	
EPSON Stylus Pro XL	

For these printers, you simply select the correct printer calibration profile before you scan an image. See "Scanning Using Calibration" on page 2-7.

If you have a color printer that is not a color EPSON Stylus, you must create a printer calibration profile using the instructions in this section. It is also best to create additional profiles for different printer settings, as described below.

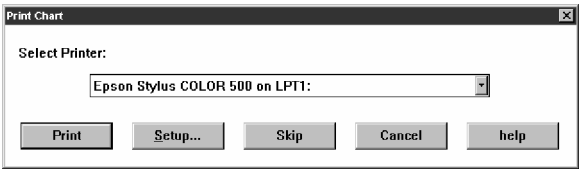
Performing the Printer Calibration

Follow these steps:

1. From Windows 95, click the Start button, point to Programs, point to EPSON Scanner, and then click EPSON Printer Calibration.

   From the Windows 3.1 Program Manager, double-click on the EPSON Printer Calibration icon in the EPSON Scanner program group.

You see the Print Chart dialog box.



2. Select the printer you want to calibrate from the drop-down menu.

   Note:
   You must generate a specific profile for each of your printer's settings. For example, the profile for your printer's coated paper setting and for its plain paper setting may not be the same. To change the printer settings, click the Setup *button before printing the calibration chart.*

3. Click the Print button to print the calibration chart. (If you have printed the calibration chart before with the same printer, click the Skip button.)

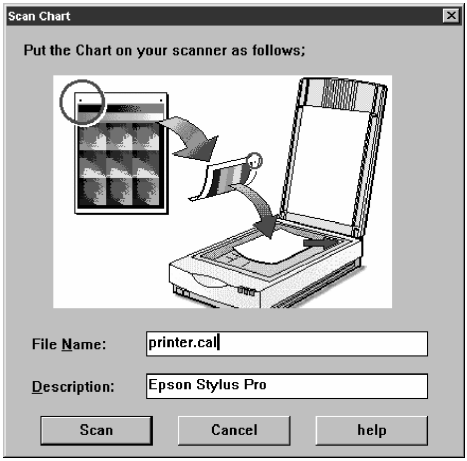
   Note*:*
   To print images on more than one color printer, print a calibration chart on each printer you'll use. If you plan to print the image on a service bureau's color printer, have them print the calibration chart on their printer so you can create a calibration profile for it.

   Tip:
   When you label the printed charts to help you identify which printer produced them, don't write on the chart itself. Write on the back of the page.

   Tip*:*
   If you plan to print your image on a printing press that requires a four-color separation, you'll need to ask your service bureau or printer to create a color sample using your calibration chart. You can then use that color sample to create a calibration profile.

4. You see a message box. Click OK when the chart is printed.

5. Place the printed calibration chart on your scanner, as shown by the illustration on the screen.



Align the guide mark on the upper left corner of the chart with the triangular origin mark on your scanner's document table. Then close the scanner's cover.

Note:
Make sure the calibration chart is not skewed on the bed of the scanner; if it is, the scanner cannot scan the chart.

6. If you want to change the default filename and profile description, enter your changes in the File Name and Description fields.

Tip:
If you are creating more than one calibration profile (for instance, if you have more than one color printer), make sure you assign unique descriptions to each calibration profile so you can distinguish between them.

7. Click the Scan button. The scanner scans the chart and the calibration utility sends the profile to EPSON TWAIN.

   When calibration is finished, the message Calibration profile completed appears on the screen.

8. Click OK to exit the calibration utility.

   The profile data is saved with the filename you entered, and the description is added to the Calibration list in EPSON TWAIN's Destination dialog box, described on page 3-12.

Scanning Using Calibration

If you are using one of the predefined printer calibration profiles, such as one of the EPSON Stylus printer profiles, or you have created a custom calibration profile for your printer, you can now use that profile to scan and print your image.

Follow these steps to use a calibration profile when you scan:

1. Select your scanner. For example, choose Acquire from the File menu within your application, and choose Select TWAIN_32 Source (in Windows 95) or Select TWAIN Source (in Windows 3.1). Then select EPSON Scanners (32 bit) in Windows 95, or EPSON Scanners in Windows 3.1.

   Note:
   You usually need to perform this step only once, when you use the scanner with your software for the first time.

2. Next select EPSON TWAIN. For example, choose Acquire from the File menu within your application; then choose TWAIN_32 (in Windows 95) or TWAIN (in Windows 3.1).

3. You see either the easy or the advanced screen. If you see the easy screen, click Advanced.

4. Click Destination to display the Destination dialog box.

5. In the Destination Name field, select the name of your output device. If you have one of the EPSON Stylus printers listed on page 2-4, select the printer from the Destination Name menu. The Calibration description is assigned automatically. Go to step 8.

   If you created a custom calibration profile for your printer, type a unique name for the profile in the Destination Name field. Go to step 6.

6. From the Calibration pull-down menu, select the profile name you assigned when you created the profile.

7. Click Save.

8. Click OK. You see the EPSON TWAIN advanced screen.

You can now preview or scan your image using the calibration profile for your color printer.

***Tip**:*
If the colors in your printed image do not closely match the original, recalibrate your monitor and your printer and try again.

Chapter 3

Capturing Images From Within Applications

When you scan an image from within an application using EPSON TWAIN, you follow these basic steps:

1. Turn on your scanner.
2. Access TWAIN from your application's File menu.
3. Choose either the easy or advanced TWAIN screen.
4. Select the correct image type and destination settings.
5. Preview the image and select the scan area (advanced screen only).
6. Scan the image.
7. Close TWAIN and edit the image in your application.

This chapter provides guidelines for performing each of these basic steps.

If you don't need to preview the image you are scanning and want to specify only the document source (if available), image type, and destination, you can use the easy screen; see page 3-4.

To set the image resolution, size, or scale, preview the image, select a calibration profile, or add, delete, or modify an image or destination before you scan, you must use the advanced screen; see page 3-7. (To use the special effects features in the advanced screen, see Chapter 4.)

Note:
If your application does not support TWAIN, you can use EPSON Scan! II to scan an image and export it in a format your image editing software can use. See Chapter 5 for more information.

Accessing EPSON TWAIN

Follow these steps to access EPSON TWAIN from within your application:

1. Turn on your scanner and place a document on the scanner's document table.

   Note:
   If you start the software before turning on your scanner, the software may not be able to detect the scanner.

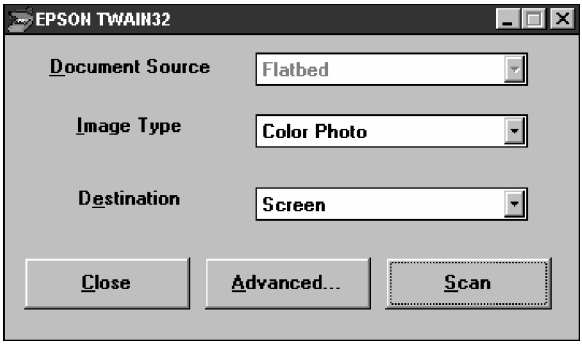
2. Select your scanner. For example, choose Acquire from the File menu within your application, and choose Select TWAIN_32 Source (in Windows 95) or Select TWAIN Source (in Windows 3.1). Then select EPSON Scanners(32 bit) in Windows 95, or EPSON Scanners in Windows 3.1.

   Note:
   You usually need to perform this step only once, when you use the scanner with your software for the first time.

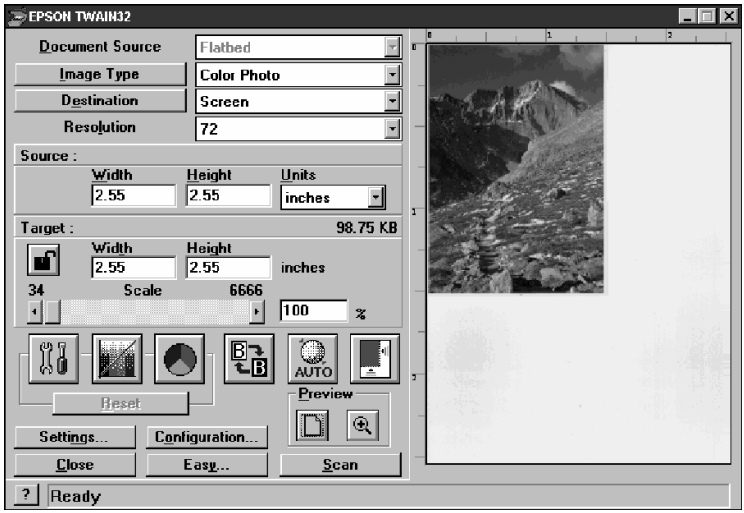
3. Next select EPSON TWAIN. For example, choose Acquire from the File menu within your application; then choose TWAIN_32 (in Windows 95) or TWAIN (in Windows 3.1).

   When TWAIN opens, you see either the easy or the advanced screen, depending on which was opened last.

The easy screen allows you to select the document source (if available), type, and destination of your image. When you scan with this screen, your entire image is captured and scanned.



The advanced screen lets you select the same basic settings as the easy screen, plus you can modify, add to, or delete these settings. The advanced screen also lets you set the image resolution, size, or scale, preview your image, and select the portion of it you want to scan. As described in Chapter 4, you can change special effects settings from the advanced screen as well.



Note:
To close an active TWAIN window, click the Close *button.*

Using the Easy Screen

The following basic settings are available on the TWAIN easy screen:

- ❏ Document source
- ❏ Image type
- ❏ Destination.

You must select the appropriate option for each of these settings as described in this section to successfully scan your image. Then see "Scanning the Image" on page 3-20 to scan your image.

Selecting the Document Source

If you have the optional automatic document feeder (ADF) or transparency unit installed on your scanner, you can select the option you want to use from the Document Source pull-down menu. Otherwise, leave the Document Source set to Flatbed. The following table describes the available options:

Document Source options

Source option	Function
Flatbed	Scans the image from the document table
Auto Document Feeder*	Scans images as they feed through the ADF (multipage scanning)
TPU for Pos. Film*	Scans a positive image from the transparency unit
TPU for Neg. Film*	Scans a negative image from the transparency unit

* These options are available only when the option is installed on the scanner.

Note:
When the automatic document feeder is installed, the easy and advanced screens contain checkboxes for selecting one page or all pages in a document.

Selecting the Image Type

To scan images with satisfactory results, you must select the correct image type option from the Image Type pull-down menu. The following options are available:

Color Photo
256 Colors
Black & White Photo
Color Halftone
Copy/Fax
Color Drawing
Black & White Halftone
Line Art
OCR

If you haven't changed any of the settings for these options, the image type you select uses the default settings listed in Appendix A. To add a new Image Type option or modify any existing settings, see "Using the Advanced Screen" on page 3-7.

To scan text, select OCR (for Optical Character Recognition) from the Image Type pull-down menu. Leave the Image Type settings for the OCR option at their defaults, listed in Appendix A.

Selecting the Destination

You select the destination or output device to indicate where you want to display or print the scanned image. You can select one of the following options from the Destination pull-down menu:

General
Screen
Impact Dot Printer
Thermal Printer
Inkjet Printer
Laser Printer
Laser 600dpi
Fax
OCR
Calibration Profile
Stylus COLOR
Stylus Pro XL
Stylus Pro
Stylus COLOR II
Stylus COLOR IIs
Stylus 1500
Stylus COLOR 500
Stylus COLOR 200

If you haven't changed any of the settings for these options, the destination you select uses the default settings listed in Appendix A. To add a new Destination option or modify any existing settings, see "Using the Advanced Screen" on page 3-7.

To scan text, select OCR (for Optical Character Recognition) from the Destination pull-down menu. Leave the Destination settings for the OCR option at their defaults, listed in Appendix A.

Using the Advanced Screen

The TWAIN advanced screen allows you to select the same basic settings as the easy screen, and also to add new options and modify existing ones. In addition, you can select calibration profiles, enable the text enhancement technology or automatic area segmentation features, preview an image, and alter it before you scan.

Note:
For information about using the basic settings, see "Using the Easy Screen" on page 3-4.

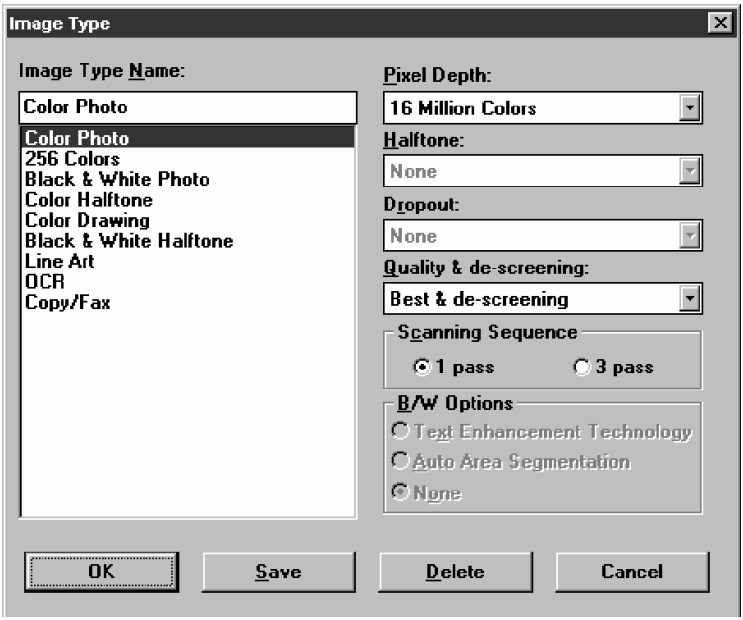
To access the advanced screen, click the Advanced button on the easy screen, if necessary. Then see the sections below to modify settings, work with calibration profiles, or preview your image.

Note:
Some options on the advanced screen may be dimmed and cannot be selected because of the capabilities of your scanner or your choice of settings for other options.

Modifying an Image Type

To modify the Image Type settings, click the Image Type button.

You see the Image Type dialog box:



For the default settings for the predefined image types, see Appendix A.

Not all options in the Image Type dialog box are available with all scanners, image types, or Pixel Depth settings. See page 3-11 for more information on when the Pixel Depth settings are available. The table below describes the Image Type advanced options.

Image Type advanced options

Category	Option	Function
Pixel Depth	Black & White	Uses a data format of 1 bit/pixel to produce black and white images
	16 Gray	Uses a data format of 4 bits/pixel to produce 16 shades of gray
	256 Gray	Uses a data format of 8 bits/pixel to produce 256 shades of gray
	8 Color	Uses a data format of 1 bit/pixel/color to produce images in 8 colors
	256 Color	Uses a data format of 8 bits/pixel/color to produce images in 256 colors
	16 Million Colors	Uses a data format of 8 bits/pixel/color to produce images in 16 million colors
Halftone*	None	Determines tones based on data format
	Mode A	Converts image into a hard tone to produce a distinct image (1 and 2 bits/pixel/color)
	Mode B	Converts image into a softer tone; most suited for images containing large areas of similar tones (1 bit/pixel/color)
	Mode C	Represents images in the same way as the net screen commonly used for newspaper photographs (1 bit/pixel/color)
	Dither A	Expresses halftone in a 4 × 4 bayer dither pattern
	Dither B	Expresses halftone in a 4 × 4 spiral pattern
	Dither C	Expresses halftone in a 4 × 4 net screen dither pattern
	Dither D	Expresses halftone in 8 × 8 net screen dither pattern

Image Type advanced options (continued)

Category	Option	Function
Dropout	None	Includes all color values in a monochrome scan
	Red	Drops out reds so red areas are white in a monochrome scan
	Green	Drops out greens so green areas are white in a monochrome scan
	Blue	Drops out blues so blue areas are white in a monochrome scan
Quality & descreening	Draft & fast	Provides faster scanning at a lower resolution
	Best & de-screening	Produces the best quality scan and, on some scanners**, removes unwanted moiré (interference) patterns from scanned images
Scanning Sequence	1 pass	Scans the image with a single pass (line sequence)
	3 pass	Scans the image with three passes (page sequence); available only in 16 million colors
B/W Options	Text Enhancement Technology	Eliminates the document background and raises the recognition accuracy during OCR (Optical Character Recognition) scanning. See page 3-21 for more information.
	Auto Area Segmentation†	Separates text from graphics so that grayscale images are clearer and text recognition is more accurate
	None	Selects no special black and white options

* When possible, let your image editing software perform halftoning.

** ActionScanner II, ES-1000C, ES-1200C, and Expression 636.

† The Text Enhancement Technology and Auto Area Segmentation options are not available if your scanner does not support these features. The ActionScanner II, ES-1000C, ES-1200C, and Expression 636 scanners support Text Enhancement Technology. The Expression 636 scanner supports Auto Area Segmentation.

The following table identifies the options available with each Pixel Depth setting. Since both the Draft & fast and Best & de-screening Quality options are available with all the Pixel Depth settings, the table does not include these options. The table also does not include the Text Enhancement Technology and Auto Area Segmentation options; these are available only when Pixel Depth is set to Black & White.

Pixel Depth option selection matrix

Pixel Depth	Halftone	Dropout	Scanning Sequence
Black & White	None Mode A (Hard tone) Mode B (Soft tone) Mode C (Net Screen) Dither A (4 × 4 Bayer) Dither B (4 × 4 Spiral) Dither C (4 × 4 Net Screen) Dither D (8 × 8 Net Screen)	None Red Green Blue	1 pass
16 Gray	None	None Red Green Blue	1 pass
256 Gray	None	None Red Green Blue	1 pass
8 Color	None Mode A (Hard tone) Mode B (Soft tone) Mode C (Net Screen) Dither A (4 × 4 Bayer) Dither B (4 × 4 Spiral) Dither C (4 × 4 Net Screen) Dither D (8 × 8 Net Screen)	None	1 pass
256 Color	None	None	1 pass
16 Million Colors	None	None	1 pass 3 pass*

* When you choose 3 pass, your application does not use the Calibration, Color Filter, or Saturation features in TWAIN; see Chapter 4 for more information.

Saving and deleting an image type

To modify an existing image type, select it from the Image Type Name menu and change the necessary settings. Click Save and then click OK.

To add a new image type, select an existing type that closely resembles the one you want to create. Then delete the existing name from the Image Type Name field and type a new name. Change the displayed Image Type settings as necessary. Click Save and then click OK.

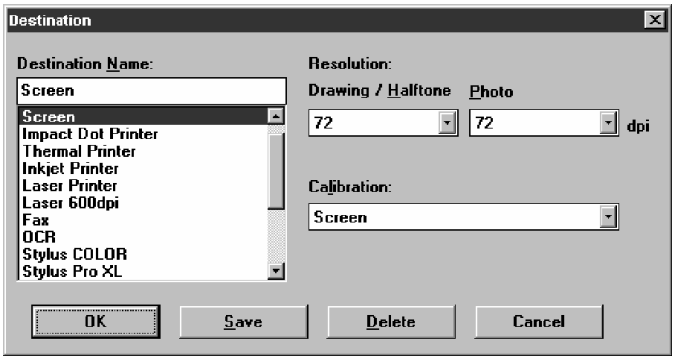
Note:
If you don't click Save *before you click* OK*, the image type settings are not changed.*

To delete an existing image type, select it from the Image Type Name menu and click Delete; then click OK.

Modifying the Destination

The Destination dialog box allows you to define different resolutions for each destination output device. You can also use it to modify, add, or delete a calibration profile for your output device.

To modify the Destination settings, click the Destination button. You see the Destination dialog box:



The Destination Name menu lists the names of the predefined and custom destination output devices. For the default settings for the predefined destination output devices, see Appendix A.

Selecting resolution settings

Use the Resolution pull-down menus to select scanning resolutions that produce the best results for your image type and output device. In the Destination dialog box, you can select one resolution for line drawings and halftones and a separate resolution for photographs.

Note:
You can also select a resolution setting from the Resolution pull-down menu on the advanced screen.

The best resolution setting for your image depends on the type of image you are scanning and your final output device, as well as the capabilities of your scanner. The following table shows the best scanning resolutions for most needs.

Optimum scanning resolutions

Output device	Line art	Grayscale	Color
Monochrome printer	300-600	80-170	—
Desktop or office color printer	300-720	150-240	150-240
Printing press or imagesetter	600-1200	150-350	150-350
Computer Screen	72	72	72

The Resolution setting depends on the Pixel Depth setting in the Image Type dialog box. When Pixel Depth is set to 8 Color or Black & White, you can set the Drawing/Halftone resolution. For other Pixel Depth settings, you can set the Photo resolution.

Note:
The Resolution setting is closely related to the Image Size and Scale settings (described in this chapter). If you change them arbitrarily, the resulting image may not be what you expected.

The higher the resolution you select, the larger the resulting image file. For example, an 8.5 × 11 photograph scanned at 300 dpi can produce a 24MB file. The same photograph scanned at 72 dpi creates only a 1.36MB file. Large files take longer to process and print, so consider the limitations of your computer system and hard disk drive when you select a resolution. To keep file sizes manageable, select the lowest possible resolution that gives acceptable quality.

Tip:
As a rule of thumb for any image except line art, use scanning resolutions that are one third of your output resolution. For example, use a scanning resolution of up to 110 with a 300 dpi laser printer and up to 170 with a 600 dpi laser printer. For the color EPSON Stylus printers, choose a resolution from 100 to 240 dpi for 720 dpi output and from 100 to 150 dpi for 360 dpi output.

Tip:
For printing on a commercial printing press, multiply the lines per inch (lpi) the press prints by 2 to determine your scanning resolution. For example, if your lpi is 150, try scanning at 300 dpi. (If the file size is too large, multiply the lpi by 1.5 to determine the scanning resolution.)

Tip:
If you plan to enlarge an image when you print it, scan it at a higher resolution than you normally would.

Selecting a calibration profile

Use the Calibration pull-down menu to select a predefined or custom calibration profile that matches your output device. TWAIN can then use the profile as it scans to create the best quality image.

EPSON TWAIN provides the following predefined calibration profiles:

General
Screen
Impact Dot Printer
Thermal Printer
Inkjet Printer
Laser Printer
Laser Printer 600
Stylus COLOR IIs
Stylus Pro
Stylus Pro XL
Stylus 1500
Stylus COLOR
Stylus COLOR II
Stylus COLOR 200
Stylus COLOR 500

In addition to the calibration profiles provided with the Scanning Utilities, you can create your own calibration profiles for any output device you use. For more information, see Chapter 2.

Note:
The scanner uses the calibration profile you select only when the Pixel Depth is set to 8 Color, 256 Color, *or* 16 Million Colors, *and the Scanning Sequence is set to* 1 pass. *For more information on the Pixel Depth and Scanning Sequence settings, see "Modifying an Image Type" on page 3-7.*

Saving and deleting a destination

To modify an existing destination, select it from the Destination Name menu and change the necessary settings. Click Save and then click OK.

To add a new Destination, select an existing one with similar settings to the one you want to create. Then delete the existing name from the Destination Name field and type a new name. Change the displayed Destination settings and click Save; then click OK.

Note:
If you don't click Save *before you click* OK, *the Destination settings are not changed.*

To delete an existing destination, select it from the Destination Name menu and click Delete; then click OK.

Previewing and Adjusting the Image

Once you have selected the Image Type and Destination settings, you can preview and adjust your image before you scan it. (To use the special effects features available on the advanced screen, see Chapter 4.)

The TWAIN advanced screen provides two icons that allow you to preview your image: the Preview icon and the Zoom Preview icon:

Preview icon

Zoom Preview icon

Click the Preview icon to preview the entire document table in the preview window.

Click the Zoom Preview icon to preview an area you have selected with the mouse. See the next section for instructions on selecting the preview area.

If you click the Zoom Preview icon before you select an area, the preview includes the entire document table.

Note:
You cannot preview an image that exceeds available memory or disk space.

Tip:
If you cannot see the image clearly after you preview it, change your video display settings in Windows 95 Display or Windows 3.1 Setup to a lower resolution with more colors. Then perform a screen calibration again.

Adjusting the preview area

Once you see a preview of the image on the screen, you can define the area you want to scan or select the entire image area.

To define a specific area, position the mouse pointer at a corner of the area; the pointer changes to a +. Hold down the mouse button as you drag the pointer across the image. When you release the mouse button, a rectangle on the screen identifies the scan area.

To adjust the size of your selected area, move the mouse pointer to the edge of the selection rectangle; the pointer changes to a double arrow. Hold down the mouse button and drag the edge of the rectangle to the new location.

You can also move the position of the selected area. Place the mouse pointer inside the selection rectangle; the pointer changes to a hand. Hold down the button to drag the selection rectangle to the new location.

Click the preview image to cancel the selection. Double-click the image to select the entire image.

If your image is smaller than the document table, you can click the Auto Locate icon,  , to select the entire image and crop out everything on the document table except the image. See "Using Automatic Features" in Chapter 4 for more information about using the Auto Locate icon.

Adjusting the source and target image sizes

The vertical and horizontal rulers along two sides of the preview window provide the measurements for the image you are previewing. You can change the unit of measure for these rulers by selecting inches, pixels, or cm (centimeters) from the Units pull-down menu.

The size of the full image or the selected area appears in the Width and Height fields in the Source area. You can type new values in these fields to define a selection area of a specific size.

As you modify your selection area or other image settings, you see the file size of the image change in the Target field. The Target Width and Height values change as well. You can also type new values in the Target Width and Height fields to specify the size of the output image.

To keep specific values in the Target Width and Height fields, select the Lock icon. Click the Lock icon once to lock the values in place; the Lock icon shows a closed lock. Click it again to unlock the values.

Note:

- ❏ *Some applications convert the image to full 24-bit data, so the actual size of the image may be larger than the value displayed in the* Target *field.*

- ❏ *The image size settings are closely related to the Resolution and Scale settings. If you change them arbitrarily, the resulting image may not be what you expected.*

Setting the image scale

The Scale value (in the Target area) displays the amount by which an image is enlarged or reduced during a scan. To change this value, move the slide bar, click the left or right arrow to change the image size in 1% increments, or type the value you want into the % field.

- ❏ ***Note:***
  If you increase the Scale size, the Target *value also increases to indicate a larger file size.*

You can use the Lock icon to keep the Scale value constant. Click the Lock icon once to lock the value; the icon shows a closed lock. Click it again to unlock the value.

Note:

- ❏ *The range of possible Scale settings varies depending on the current Resolution setting.*
- ❏ *For ES 600C, ES 800C, and ES 1200C scanners, the possible Scale settings are limited to this range: half the normal size (50%) to twice the normal size (200%). The Scale setting does not depend on the Resolution setting.*
- ❏ *The Scale setting is closely related to the Resolution and image size settings. If you change them arbitrarily, the resulting image may not be what you expected.*

Scanning the Image

When you are finished selecting settings on the easy or advanced screen, you can scan the image by choosing the Scan button.

If you click Scan from the easy screen, TWAIN automatically selects the entire image, adjusts the exposure, and scans it.

If you are using the advanced screen, you can check that the image you are scanning looks just right in the preview window before you click the Scan button.

If you are scanning from the advanced screen and have not previewed the image or selected a preview area for it, be sure to click the Auto Locate icon before choosing Scan. Otherwise, the entire document table is scanned.

When you close the TWAIN screen, you can further modify your image using the features of your image editing software.

Note:

- ❏ *You cannot scan an image that exceeds available memory or disk space.*
- ❏ *Before you start scanning, you should calibrate your scanner, monitor, and printer as described in Chapter 2.*
- ❏ *After you scan an image, be sure to save it. For information on saving and exporting image files, see Chapter 5.*

Scanning Text

For best results when scanning text, use EPSON's Text Enhancement Technology. This feature filters out background "noise" in text images, such as background colors, and increases the threshold levels so that your OCR (optical character recognition) software can recognize text more easily.

If your scanner supports Text Enhancement Technology, select OCR from the Image Type Name menu. This automatically activates the Text Enhancement Technology feature. Then select OCR from the Destination Name menu.

Note:
If your scanner does not support Text Enhancement Technology, this option is not available.

Chapter 4

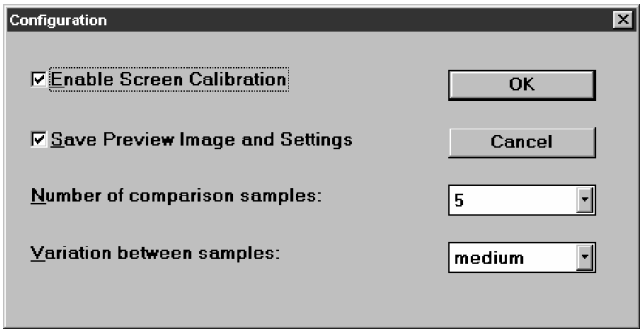
Using Special Effects

The EPSON TWAIN advanced screen gives you many options for editing images before you scan them. If you have image editing software, you can achieve all of the special effects described in this chapter—and more—using that software. However, if you don't have image editing software, EPSON TWAIN allows you to create a broad range of special effects using these options:

- ❏ TWAIN configuration
- ❏ Image controls
- ❏ Tone correction
- ❏ Color adjustments
- ❏ Invert image feature
- ❏ Automatic features.

Modifying the TWAIN Configuration

When you click the Configuration button on the TWAIN advanced screen, you see the following dialog box:



If you have performed a screen calibration (as described in Chapter 2), you can enable it by selecting the Enable Screen Calibration option.

To save the preview image so it reappears in the preview window when you next open the advanced screen, select the Save Preview Image and Settings option.

Use the Number of comparison samples pull-down menu to select the number of samples (either 3 or 5) to display in the preview area when you select the Comparison icon for any of the special effects features described in this chapter. Comparison samples let you select the image you prefer from a group of preview images that use different settings.

You can also define the amount of variation between the settings displayed in the comparison samples by selecting small, medium, or large from the Variation between samples pull-down menu.

Using the Image Controls

The image controls available when you click the Image Controls icon,  , let you adjust the following options:

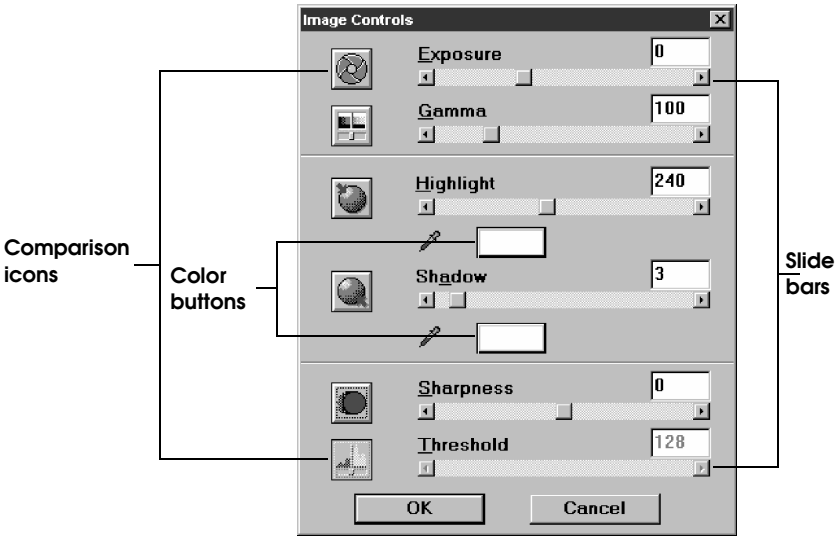
- ❏ Exposure changes the intensity of light
- ❏ Gamma determines the gradation between highlights and shadows
- ❏ Highlight adjusts the lightest areas
- ❏ Shadow adjusts the darkest areas
- ❏ Sharpness adjusts the focus
- ❏ Threshold adjusts the point at which the gray values change to either black or white. This option is available only when the Pixel Depth setting is Black & White and the Halftone setting is None in the Image Type dialog box. When Threshold is available, the other image control settings are not available.

Follow these steps to use the image controls:

1. From the advanced screen, click the Preview icon,  , to display your image in the preview window.

Tip:
To scan only a portion of the image displayed in the preview window, define the area you want to scan and click the Zoom Preview icon,  , to display only that area. This makes your comparison previews larger and easier to see.

2. Click the Image Controls icon. You see the following dialog box:



3. Adjust the settings until you are satisfied with the appearance of the image in the preview window. See the following table for guidelines on changing these settings.

Method	Description
Value fields	Type the value you want for the current option.
Slide bars	Move the slide bar until the preview looks correct.
Comparison icons	Click the Comparison icon next to the slide bar to display 3 or 5 comparison samples using different settings. In the preview window, click the sample that most closely reflects the image you want. That sample is selected and placed in the middle position,* and a different set of samples is displayed based on the image you selected. Repeat this process until the image sample you want is displayed in the middle position; then double-click it and it reappears alone.
Highlight and Shadow Color buttons*	Click the Color button below the Highlight or Shadow slide bar; the mouse pointer changes to an eyedropper. Select the color you want to represent the highlights or shadows from the preview image. When you select the color in the preview window, the button turns that color.

* You cannot choose the Highlight and Shadow Color buttons when the preview window is displaying comparison samples.

Note:
Appendix A lists the available ranges for the image controls.

4. When the image in the preview window looks the way you want, click OK.

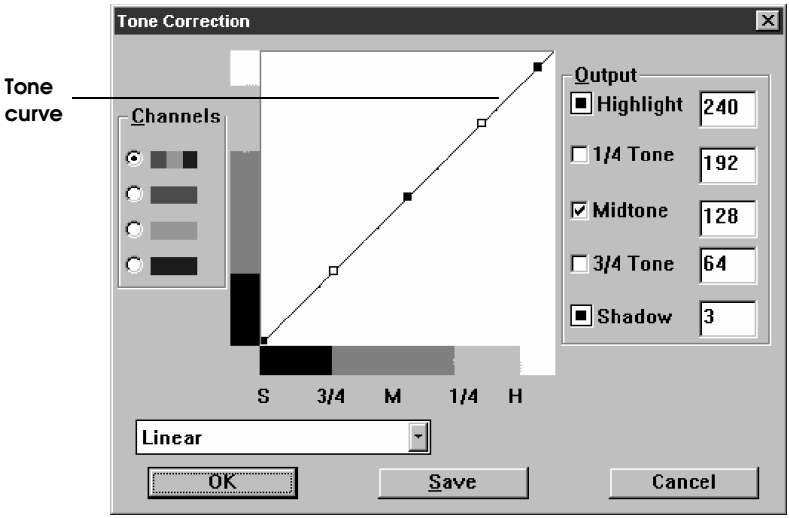
5. You can now scan the image into your application.

You can reset any preview image you've modified by choosing the Reset button below the Image Controls icon on the advanced screen.

Adjusting the Tone Correction

Adjusting the tone levels lets you change the pixel brightness in the midtones, highlights, and shadows of an image without dramatically changing it. This modifies the contrast in image tones so they reproduce with greater detail.

To adjust the tone correction, click the Tone Correction icon,  , from the advanced screen when the preview window displays your image. You see the following dialog box:

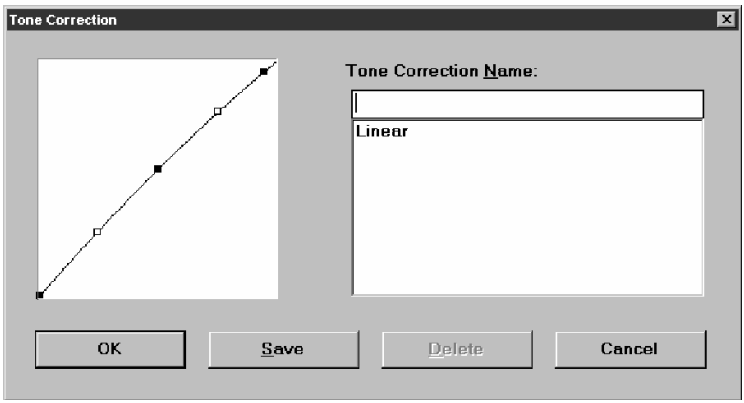


You can adjust the tone values by dragging points on the tone curve. You see the effect of your new settings in the preview window.

Using the Channels radio buttons, select the color(s) you want to modify the tone correction for. You can select all colors (RGB) or only red, green, or blue.

Each Output checkbox corresponds to the point next to it on the tone curve. When you click the checkbox for a specific point, you can move that point, but it is not affected by the movement of other points. If the box is not checked, the point moves depending on the movement of the other points.

If you modify the tone correction setting, you can save it for future use by choosing the Save button. You see the following dialog box:



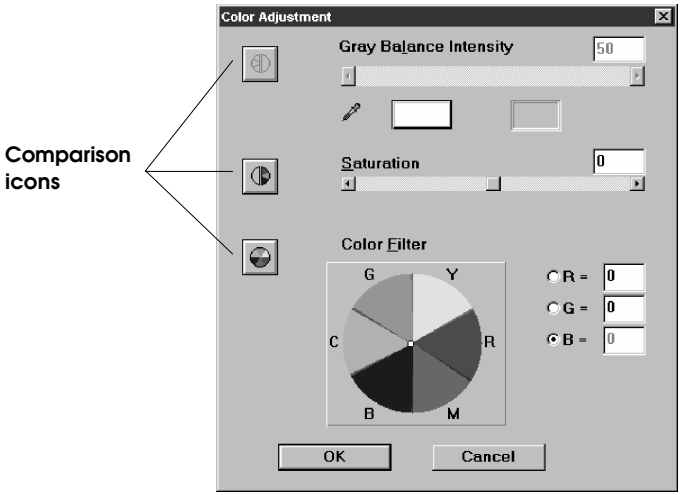
To save your tone correction setting, type the name you want to assign to the setting in the Tone Correction Name field and click Save. Then click OK. The name for your new setting is now available in the pull-down menu.

You can also delete an existing setting by selecting it from the Tone Correction Name field and clicking Delete. Then click OK to return to the Tone Correction dialog box.

You can reset any preview image you've modified by choosing the Reset button below the Tone Correction icon on the advanced screen.

Adjusting Colors

After you have previewed the image, click the Color Adjustment icon,  . You see the following dialog box:



Note:
If the Image Type is set for grayscale or black-and-white images, the Color Adjustment icon is dimmed and cannot be selected.

The Color Adjustment dialog box lets you change the following settings:

- ❏ Gray Balance Intensity
- ❏ Saturation
- ❏ Color Filter.

You can reset any preview image you've modified by choosing the Reset button below the Color Adjustment icon on the advanced screen.

Setting the Gray Balance Intensity

Neutral shades of gray are produced by mixing the three colors in the image in approximately equal proportions. Sometimes, however, the resulting gray shades are not truly neutral. To create a more neutral gray, adjust the Gray Balance Intensity setting.

Click the left Color button below the Gray Balance Intensity slide bar; the mouse pointer changes to an eyedropper. Select the color in the preview image you want to neutralize. Then either move the slide bar to adjust the color, or click the Comparison icon next to the slide bar to choose the coloring you want from the comparison samples. The rectangle to the right of the Color button shows the result of your color adjustment.

Changing Saturations

Changing the saturation level of a color increases or decreases the amount of color in a specific hue. Less saturated colors are more pale while saturated colors are richer.

You can change the saturation levels in the preview image by adjusting the Saturation slide bar. You can also click the Comparison icon next to the slide bar to choose the saturation level you want from the comparison samples.

To completely remove color from an image, move the Saturation slide bar all the way to the left.

Note:
The Saturation setting is ignored if 3 pass *is selected as the Scanning Sequence in the Image Type dialog box.*

Using Color Filters

Color filters can help eliminate color tinges (or an undesirable overall color tone) that exist in the original. You can also use filters to give your image a specific color effect.

Click any point in the Color Filter wheel to increase that color in the image. Numerical values for the amount of red, green, and blue are shown to the right of the color wheel. You can also click the radio button for a color (red, green, or blue) to set the value of that color to zero. Then you can type in the values you want for the other two colors.

Click the Comparison icon for Color Filter to select the color filter you want from the comparison samples.

Note:
The Color Filter setting is ignored if 3 pass *is selected as the Scanning Sequence in the Image Type dialog box.*

Inverting an Image

The Invert icon,  , creates a negative of an image. You can use this icon to turn a positive image into a negative or to create a positive image from a negative.

Note:
To scan a negative image and invert it, your scanner must have a transparency unit installed and you must select Transparency Unit *as your Document Source option.*

To invert an image, preview the image and click the Invert icon. You see the inverted image in the preview window.

Using Automatic Features

The TWAIN advanced screen offers two automatic features:

- ❏ Auto Exposure, which automatically adjusts the exposure of an image and sets the Highlight and Shadow settings
- ❏ Auto Locate, which locates and selects the target image in the preview window.

Note:
When you scan using the easy screen, these automatic features are always in effect.

Using Auto Exposure

After you preview an image, click the Auto Exposure icon,  , to automatically adjust the exposure of the image and the Highlight and Shadow settings in the Image Controls dialog box.

Using Auto Locate

After you preview an image, click the Auto Locate icon,  , to crop out everything on the document table except the image.

If a document contains more than one image, use the mouse to roughly define the scan area, then click the Auto Locate icon. Auto Locate defines the image area to include only the images or portions of the image you've selected.

Chapter 5

Using EPSON Scan! II

You can always scan an image using your TWAIN-compliant image editing application. However, if your application is not TWAIN-compliant, you can use EPSON Scan! II to scan the image and export it in a format your application can open. You can also copy all or part of your image to the clipboard and resize the displayed image for easier viewing.

Saving a Scanned Image

Before you export an image, you need to save it in its original EPSON Scan! II format. Otherwise, you will not be able to retrieve it again in EPSON Scan! II. Follow these steps:

1. Turn on your scanner and place a document on the scanner's document table.

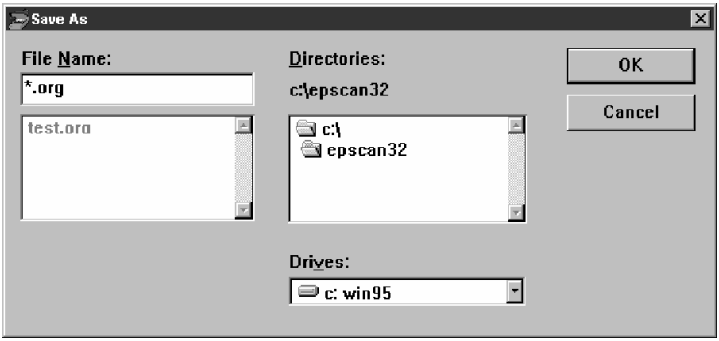
   Note:
   If you start the software before turning on your scanner, the software may not be able to detect the scanner.

2. Start EPSON Scan! II.

3. Select Acquire from the File menu.

4. Click Scan to scan your image.

5. Choose Save As from the File menu. You see the following dialog box:



6. Choose the drive and directory where you want to save the image.

7. Type a filename for your image in the File Name field. Make sure to use the file extension **.org**.

8. Click OK.

The image is saved in the EPSON Scan! II file format. You can now open this file in EPSON Scan! II and export it in a different format, as described below.

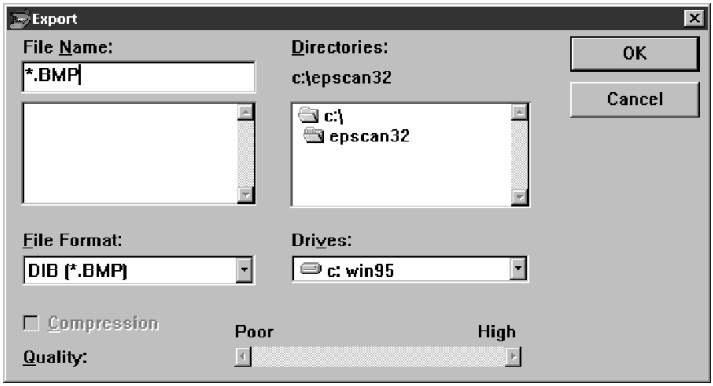
Exporting an Image

EPSON Scan! II allows you to export an image in a file format your application software can use. For information on file formats your software can open, see your software manual.

Note:
Your application software cannot open images saved in the EPSON Scan! II file format and EPSON Scan! II cannot open an exported image file. Always save an image in EPSON Scan! II before exporting it.

Follow these steps to export a scanned image from EPSON Scan! II:

1. Choose Export from the File menu. You see the following dialog box:



2. Choose the drive and directory where you want to save the image.

3. Type a filename for your image in the File Name field.

4. You can choose one of these formats from the File Format pull-down menu: DIB, EPSF, TIFF5.0, TIFF6.0, JPEG, and PCX. (For a description of these file formats, see the Term Glossary.)

   Note:
   You can select the TIFF6.0 or JPEG format only if you selected 16 Million Colors *or* 256 Gray *for the Pixel Depth setting in the Image Type dialog box when you scanned the image. You cannot select the PCX format if you selected* 16 Million Colors.

5. If you selected the TIFF6.0 or JPEG format, EPSON Scan! II allows you to choose the image quality. Since JPEG uses a Lossy compression scheme, selecting higher quality gives you less compression. To choose the image quality, move the Quality slide bar to the desired setting.

6. Click OK.

The image is saved in the selected file format. You can now import this file into your application software; see your software manual for instructions.

Acquiring and Exporting an Image

EPSON Scan! II allows you to scan and export an image directly into a selected file format, without displaying it on the screen. Since the image is not displayed, you can perform scanning operations more quickly.

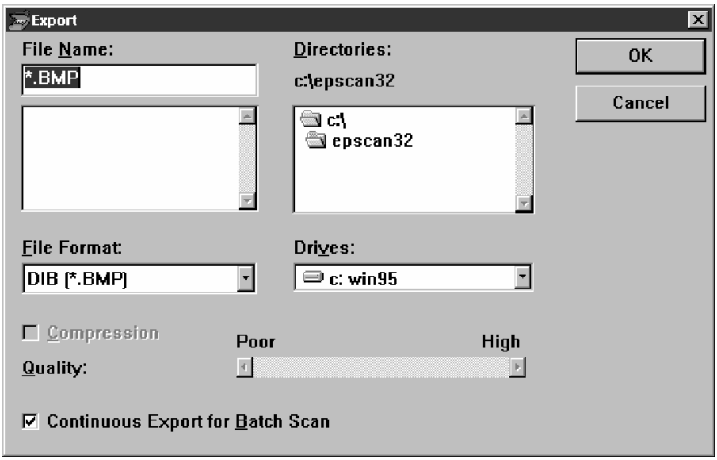
Note:
EPSON Scan! II cannot open an image file after it is exported.

Follow these steps:

1. Start EPSON Scan! II, if necessary.

2. Choose Acquire & Export from the File menu. You see the TWAIN screen. (If you see the easy screen, click Advanced.)

3. Click Scan. You see the following dialog box:



4. Choose the directory and drive where you want to save the exported image.

5. Type a filename for your image in the File Name field.

6. You can choose one of these formats from the File Format pull-down menu: DIB, EPSF, TIFF5.0, TIFF6.0, JPEG, and PCX. (For a description of these file formats, see the Term Glossary.)

   Note:
   You can select the TIFF6.0 or JPEG format only if you selected 16 Million Colors *or* 256 Gray *for the Pixel Depth setting in the Image Type dialog box when you scanned the image. You cannot select the PCX format if you selected* 16 Million Colors.

7. If you selected the TIFF6.0 or JPEG format, EPSON Scan! II allows you to choose the image quality. Since JPEG uses a Lossy compression scheme, selecting higher quality gives you less compression. To choose the image quality, move the Quality slide bar to the desired setting.

8. Click OK.

The image is scanned and exported in the selected file format. You can now import this file into your application software; see your software manual for instructions.

Copying an Image

You can copy all or part of an image to the clipboard. Follow these steps:

1. Select the area of the image to be copied by defining it with the mouse or by choosing Select All from the Edit menu.

2. Choose Copy from the Edit menu.

You can now paste the copied image into other software.

Note:
The clipboard holds images in DIB format.

Resizing an Image

Choose All Dots 1:1 from the View menu to display a scanned image so that each pixel corresponds to one display dot on the screen. The higher the image resolution, the larger the displayed image.

Choose Fit in Window from the View menu to change the size of the scanned image to match the size of the active window.

Exiting EPSON Scan! II

To exit EPSON Scan! II, make sure you have saved or exported your image file. Then choose Exit from the File menu.

Chapter 6

Troubleshooting

If you have problems using the EPSON Scanning Utilities, or with the quality of your printed or scanned images, check the two sections in this chapter for possible solutions.

Problems Using the EPSON Scanning Utilities

Note:
You cannot select dimmed settings in EPSON TWAIN; these settings are not available because of your scanner's capabilities or your choice of other settings.

When you select a TWAIN data source, EPSON Scanners is not listed.

Either the EPSON Scanning Utilities were not installed or they were not installed correctly. Reinstall the EPSON Scanning Utilities; see Chapter 1 for instructions.

Nothing happens when you select Acquire.

Make sure your scanner is turned on and the cables are connected properly.

EPSON Scanners may not be selected as the TWAIN data source in your application. You'll usually find the Select TWAIN Source option under the File menu in your application.

If you are running Windows 3.1, you may not have restarted it after you installed the EPSON Scanning Utilities. Restart Windows 3.1 and try again.

The EPSON TWAIN data source file, or the SCSI support software may not be installed correctly. Reinstall the EPSON Scanning Utilities from your installation diskettes; see Chapter 1 for instructions.

You may have selected the wrong port number or SCSI ID during setup. Check the settings for your scanner and any other SCSI devices you may have. Then reinstall the EPSON Scanning Utilities.

You may have changed the interface from parallel to SCSI or from SCSI to parallel without reinstalling the EPSON Scanning Utilities. Reinstall the Utilities for the correct interface.

You may have tried to install the EPSON Scanning Utilities using the EZ-SCSI Setup software when you were using an interface card that does not support EZ-SCSI. The EPSON Scanning Utilities supports only SCSI host adapter interface cards that support EZ-SCSI, or are Adaptec compatible.

An error condition may have caused your application or the TWAIN data source in the EPSON Scanning Utilities to stop working correctly. Save any documents in process, close any open applications, and exit Windows. Restart Windows to restore the TWAIN data source, then start your application and try again.

Sometimes an error condition may cause the computer to display a message telling you that your scanner is not recognized. If this happens, reset your scanner by turning it off and on or pushing the Reset button. Then restart your computer and try again.

If you are using Windows 95, its hardware detection utility may not have correctly detected the SCSI controller. Restart Windows 95 and see the Windows 95 online Help utility for instructions on detecting new hardware.

The system fails or an error message appears when you choose Acquire from your application software.

You may have more than one TWAIN screen open at once. Reset your computer and use only one active TWAIN screen.

Your scanned image may be too big. Reset your system and reduce the size of the scanned image or install more memory.

The EPSON Scanning Utilities do not start.

Make sure you are using a system with the minimum requirements for the EPSON Scanning Utilities. See the Introduction in this manual.

Check that the system requirements are correct for your application software and that your software supports your scanner model.

Be sure that you have correctly installed and set up your application software.

See if your computer has enough memory to run your software. If you are running other software at the same time, using RAM resident programs, or have many device drivers installed, the computer may not have enough memory left to run the software. See the section on memory allocation in your computer manual.

The scanner does not start scanning.

See that the scanner's READY light is on.

Reinstall the EPSON Scanning Utilities and be sure to select the correct interface port and settings; see Chapter 1 for instructions. Also make sure the interface board on your computer is properly installed.

If you connected the scanner with the SCSI interface, see that the termination switch and SCSI ID are correctly set up.

If you have other expansion cards in your computer, see that they are not set at the same interrupt level or I/O address as the interface card for your scanner. See your computer manual and interface card manual.

After choosing the Preview icon, the image does not appear in the preview window.

Press Enter or click on the TWAIN preview window.

The scan is not the full width you selected in the preview area.

Some scanners--for example, the EPSON ES-600C--restrict the scan width to 4096 pixels at high resolutions. Choose a lower resolution for a wider scan.

After scanning and opening several scanned images, your application software fails and your scanned image is lost.

Save and close the scanned images before scanning a new one.

The size of your image increases after scanning it into your image editing application.

Your image editing software may be converting the image to full 24-bit data, which requires more disk space. See your application software manual for more information.

An error in the scanner or a paper jam in the Automatic Document Feeder causes an error message.

Remove the jammed paper or reset the scanner to clear the error condition; then try scanning again.

The Sharpness setting is grayed out in the Image Controls dialog box.

Your scanner does not support the Sharpness feature.

The Document Source setting is grayed out in the EPSON TWAIN screen.

This is normal. You must first connect an optional automatic document feeder or transparency unit to the scanner for any Document Source option other than Flatbed.

The Preview button is grayed out when the Automatic Document Feeder is selected under Document Source.

The preview feature is disabled when Automatic Document Feeder is selected because the document would have to be fed through the feeder for the preview scan and then reinserted into the feeder for the final scan. If necessary, use the document table for previewing your document.

Auto Locate does not work when scanning two or more originals.

Make sure none of the documents are touching one another on the document table.

If you have multiple images on a page, Auto Locate selects the whole page.

When you scan a monochrome image, the scanned image is reversed like a negative image.

If your application has an invert function, use it to reverse the image, or use the Invert feature on the TWAIN advanced screen.

Some applications misinterpret the scanner data; check with your application's manufacturer for an updated program version.

The default settings for Image Type and Destination don't meet your specific scanning requirements.

You can define your own settings; see Chapter 3 of this manual.

The Halftone setting in the Image Type dialog box is grayed out.

Halftone settings on most EPSON scanners are available only when the Pixel Depth setting is set to Black & White or 8 Colors (1 or 2 bits per pixel per color). Halftone settings are available only with the following default Image Type settings: Color Halftone, Black & White Halftone, and Copy /Fax.

The application software displays an error message, freezes, or fails after scanning.

Make sure you close the TWAIN screen before switching to your application software. (Do not use the Windows Minimize button.)

The image you scanned may be oversized. Try reducing its file size by changing its resolution or dimensions; then scan it again.

If you selected 16 Gray as the Pixel Depth setting, change to 256 Gray and try scanning again.

If you scanned an image at high resolution (such as 800 dpi) and at the maximum allowable width and using the Color Photo Image Type setting, restart Windows and reduce the resolution and the width of the scanned image. Then try scanning again.

If your application contains a scan manager feature, you may have closed it before closing the EPSON TWAIN screen. Scan your image again, but close the TWAIN screen before closing your application's scan manager.

If you selected three-pass scanning on the TWAIN screen, you may need to free some space on your hard disk to scan.

After scanning with an image editing application, the scanned image disappears.

Make sure you close the TWAIN screen before switching to your application software. (Do not use the Windows Minimize button.)

The rows in the screen calibration dialog box never seem to match closely enough.

Try adjusting your monitor's brightness and contrast settings.

The TWAIN screen changed its color settings after a preview scan.

Increase the number of colors or decrease the resolution your monitor displays using Windows 3.1 Setup or Windows 95 Display.

The colors in the Color Filter wheel do not reflect the graduated "rainbow" spectrum of colors.

Increase the number of colors or decrease the resolution your monitor displays using Windows 95 Display or Windows 3.1 Setup.

You may be using an outdated video display driver. Check with your computer manufacturer for an updated driver.

After changing video display resolutions, the computer display seems smaller or different.

You need to adjust your monitor; see the manual that came with it.

After starting a multipage scan using the Automatic Document Feeder, the image editing application freezes, displays an error message, or fails.

Reset the system and reduce the number of pages you are scanning with the Automatic Document Feeder.

After closing the EPSON TWAIN screen, a partial image of an application window appears over the scanned image.

Use the Up or Down arrow or the mouse to scroll the application's frame and clear the partial image.

Check the application software to see if it has viewing or window size options.

After you select a part of an image to scan, the scanner does not scan the image correctly.

Scan the whole image instead of a portion of it.

After changing the Windows video display setting to 1024 × 768 pixels, some icons, boxes, or slide bars in the TWAIN screen look out of proportion.

Reset your Windows video display to 800 × 600 pixels.

Problems With Image Quality

The entire image is distorted or blurred.

Make sure that the document is placed flat against the document table.

You may have moved the document during scanning. Check the position of the document.

See that the scanner is not tilted or placed on an unstable surface.

Part of the image is distorted or blurred.

Part of the original may be wrinkled, warped, or not in contact with the document table. Be sure the document is flat.

Caution:
Do not place heavy objects on the document table.

The edges of the document are not scanned.

The document table has non-readable areas around the edges. Adjust your document's position so that the image fits inside the readable area.

Color is patchy or distorted at the edges of the document.

If the original is very thick or warped at the edges, the edges of the image may be discolored. Cover the edges of the original with opaque paper to avoid interference from outside light.

If part of the original is outside the document table, the edge may not be in contact with the document table and may be discolored. Change the position of the original.

The image is faint or out of focus.

Make sure the document is placed flat on the document table.

Check your Tone Correction setting.

Make the Exposure setting darker.

Make sure you have calibrated your monitor and printer to your scanner, and that you are using the resulting calibration profile. See Chapter 2 for more information.

Check your monitor's brightness and contrast settings.

The image is too dark and without details.

When the Pixel Depth setting is Black & White or 8 Color, check that the halftone mode is selected in the Image Type dialog box.

Adjust the Exposure, Tone Correction, and Shadow settings to lighter values and scan the image again. Also check your monitor's brightness and contrast settings.

Check that the Destination output device is set correctly. If it is set to Screen, output on the printer may be too dark.

Straight lines in the image are jagged.

The document may be placed at an angle on the document table. Position it so that the horizontal and vertical lines are carefully aligned with the rulers on the document table.

The image does not look the same as the original.

Make sure you have performed the calibration procedures and selected the correct printer profile; see Chapter 2 for more information.

Try different combinations of scanner settings.

Check that your software is correctly installed.

If you are importing an image file into your application software, see if the file format is acceptable for your software. Also check that your application settings are appropriate for your image. See your application software manual.

A line of dots is always missing on the scanned image.

If this happens on your printed image, your printer or its print head may have a problem or need cleaning; see your printer manual.

If this happens on both your screen and printout, the scanner's sensor may be malfunctioning. Consult your dealer.

Using halftoning, textured dot patterns appear in the image.

This is normal. See Appendix B in this manual (if you have an Expression 636) or your scanner manual (if you have another EPSON scanner) for examples of halftoning.

The colors on the video display seem different from those of the original image.

Depending on your monitor, its resolution/color settings, and your EPSON TWAIN settings, the screen colors may be different from the original colors. This may be normal, especially if the colors in the printed image more closely match the original.

Make sure you have correctly performed the screen calibration process in EPSON Scan! II. Recalibrate and then try scanning again. (See Chapter 2 for calibration instructions.

Check your scanner settings—such as Pixel Depth, Tone Correction, and Color Adjustment—or try a different combination of these settings.

The colors on your printout seem different from those of the original image.

Check that you have correctly performed the printer calibration process in EPSON Scan! II using the correct printer profile. Recalibrate and then try scanning your image again. (See Chapter 2 for calibration instructions.)

The colors in the printed image may not match the colors of the original image exactly because the scanning and printing processes use two different color interpreting technologies.

The printed image is larger or smaller than the size of the original.

Check the image size settings in your application and TWAIN. You may also have used the Zoom Preview icon. Do not use the size of the image on your monitor to judge the printed size.

The printer cannot print the image, the printout is garbled, or the printout is not an image.

Check that the printer is properly connected to the computer and is correctly set up; see your printer manual.

Check that your software is properly installed and set up for your printer; see your software manual.

Images cannot be scanned at all or only a few dots appear in the scanned image.

Try different EPSON TWAIN settings. Be aware that some settings disable others. Also, depending on your scanner, some features may not be available.

Set the Exposure, Highlight, or Tone Correction to darker settings and scan the image again.

If you selected Line Art as the Image Type setting and any setting other than Screen as your Destination setting, try increasing the Threshold setting to a higher value.

Moiré (interference) patterns appear in the scanned image.

Moiré patterns commonly occur when you scan images that include halftone screens. To minimize this effect, try any of the following solutions:

- ❏ Move or angle the original slightly
- ❏ Change the Sharpness setting to slightly defocus the image
- ❏ Place a transparent sheet between the document and the document table
- ❏ Change the Scale setting slightly
- ❏ Scan in three-pass mode.

When you select 16 Gray for the Pixel Depth setting, the scanned image appears black in your application software.

Choose 256 Gray for the Pixel Depth setting and try scanning your image again.

The image appears upside down and truncated in your application software after scanning.

Before you scan the image, reduce its file size to less than 1MB (for line art) or less than 5MB (for color) by adjusting the settings on the TWAIN advanced screen.

When you select 256 Color for the Pixel Depth setting, the scanned image does not match the preview image.

Select Color Photo as the Image Type and try scanning again.

Select 16 Million Colors for Pixel Depth and try scanning again.

The image looks corrupted.

Check your printer driver settings. If the paper size is set larger than Letter or A4, select a smaller paper size or the maximum paper size your scanner can support. See your scanner documentation for more information.

You may need to choose a lower resolution for the video display setting using Windows 95 Display or Windows 3.1 Setup. See your Windows documentation or online help for more information.

If you change the Windows video display setting, make sure to perform another screen calibration. (See Chapter 2 for calibration instructions.)

You are scanning a transparency or slide using the transparency unit, and the scanned image is all black.

If the reflective document mat is in place, remove it; lift up the transparency unit and slide the mat up and out of the slots on the transparency unit.

The transparency unit is installed, you are scanning a normal reflective (paper) document, and the scanned image is a picture of the document table.

The reflective document mat is not in place; lift up the transparency unit and insert the reflective document mat. (See your scanner manual for instructions.)

Appendix A
Default Settings

This appendix lists the default settings for the Image Type and Destination options in EPSON TWAIN. It also provides the ranges of settings available for the TWAIN Image Controls.

Default Image Type settings

Image type	Default setting
Color Photo	16 million colors, best quality, and 1 pass scanning
256 Colors	256 colors, best quality, and 1 pass scanning
Black & White Photo	256 grays, best quality, and 1 pass scanning
Color Halftone	8 colors, Mode A (Hard tone) halftone, draft quality, and 1 pass scanning
Color Drawing	8 colors, draft quality, and 1 pass scanning
Black & White Halftone	Black-and-white, Mode A (Hard tone) halftone, draft quality, and 1 pass scanning
Line Art	Black-and-white, draft quality, and 1 pass scanning
OCR	Black-and-white, draft quality, 1 pass scanning, and Text Enhancement Technology
Copy/Fax	Black-and-white, Mode A (Hard tone) halftone, draft quality, 1 pass scanning, and Auto Area Segmentation

Default Destination settings

Destination	Default setting
General	300 dpi resolution for line drawings and halftone images, 72 dpi resolution for photos, and general calibration
Screen	72 dpi resolution for line drawings and halftone images, 72 dpi resolution for photos, and calibration for display monitor screens
Impact Dot Printer	360 dpi resolution for line drawings and halftone images, 120 dpi resolution for photos, and calibration for impact dot printers

Default Destination settings (continued)

Destination	Default setting
Thermal Printer	360 dpi resolution for line drawings and halftone images, 120 dpi resolution for photos, and calibration for thermal printers
Inkjet Printer	360 dpi resolution for line drawings and halftone images, 120 dpi resolution for photos, and calibration for inkjet printers
Laser Printer	300 dpi resolution for line drawings and halftone images, 100 dpi resolution for photos, and calibration for laser printers
Laser 600dpi	600 dpi resolution for line drawings and halftone images, 200 dpi resolution for photos, and calibration for 600 dpi laser printers
Fax	200 dpi resolution for line drawings and halftone images, 200 dpi resolution for photos, and calibration for inkjet printers
OCR	300 dpi resolution for line drawings, halftone images, and photos, with general calibration
Stylus COLOR	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for EPSON Stylus COLOR printers
Stylus Pro XL	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for EPSON Stylus Pro XL printers
Stylus Pro	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for EPSON Stylus Pro printers
Stylus COLOR II	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for EPSON Stylus COLOR II printers
Stylus COLOR IIs	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for EPSON Stylus COLOR IIs printers
Stylus 1500	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for EPSON Stylus 1500 printers

Default Destination settings (continued)

Destination	Default setting
Stylus COLOR 500	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for EPSON Stylus COLOR 500 printers
Stylus COLOR 200	800 dpi resolution for line drawings and halftone images, 240 dpi resolution for photos, and calibration for Stylus COLOR 200 printers
Calibration Profile	180 dpi resolution for line drawings, halftone images, and photos, with general calibration

Image Control setting ranges

Image control	Range of settings available
Exposure	-10 (darkest) to 20 (brightest)
Gamma	-50 (lowest) to 300 (highest)
Highlight	60 (darkest) to 980 (lightest)
Shadow	0 (lightest) to 50 (darkest)
Sharpness	-2 (least focused) to 2 (sharpest)
Threshold	0 (darkest) to 255 (lightest)

Appendix B

Expression 636 Scanner Settings

This appendix contains technical information about the various image processing functions built into the Expression 636 scanner. All functions must be controlled from the scanner software, and most functions can be combined with others to produce a variety of effects.

The table below summarizes the scanner functions and the settings available on your scanner. Each of them is explained in the following pages. All of these functions are controlled from your scanner software.

Scanner functions and settings

Function	**Available settings**
Resolution	29 settings from 50 to 2400 dpi (hardware only) Software interpolates to 4800
Scale	50% to 200% in 1% steps
Data format	1 to 8 bits/pixel/color Captures up to 12 bits/pixel/color. When it captures over 8 bits, it converts the information to 8 bits/pixel/color.
Color mode	Color line sequence mode, color page sequence mode and monochrome mode (dropout color selectable)
Brightness	7 levels
Halftoning mode	3 modes and disabled 4 dither patterns 2 user-defined dither patterns
Gamma correction	5 settings for output devices plus 1 user-defined
Color correction	4 settings for output devices plus 1 user-defined

You may need to do some trials by yourself to find out your preferred settings because the original images and the output methods you use can vary greatly.

Resolution

The output resolution determines how many pixels are used for scanning and reproducing an image. Resolution is measured in units of dpi (dots per inch), spi (samples per inch), or ppi (pixels per inch). All are equivalent units of measure. As the resolution value increases, the image is read and reproduced in finer detail. At 600 dpi, for example, an image of one square inch is represented by 360,000 dots.

The 29 resolution settings allow you to choose the best resolution for most types of printers. The settings available are 50, 60, 72, 75, 80, 90, 100, 120, 133, 144, 150, 160, 175, 180, 200, 216, 240, 300, 320, 360, 400, 480, 600, 800, 900, 1200, 1600, 1800, and 2400 dpi. To find a matching resolution for your particular output device, follow the guidelines starting on page B-13.

Size or Scale

The size or scale function allows you to reduce or enlarge the size of the output image. The value can be set in the range of 50% to 200% in increments of 1%.

When the scale is set to 100%, the image is scanned at the actual size for the current resolution. The scale values determine the vertical and horizontal lengths of the image. When the scale is set to 200% the image is enlarged four times the original size. When the scale is set to 50%, the image is reduced to one fourth of the original size.

The scale function affects the number of dots scanned. An image scanned at 180 dpi and 200% has the same number of dots as an image scanned at 360 dpi and 100%.

To enlarge or reduce the image size, use the scanner's scale function through your software at the time of scanning. Avoid increasing the image size after scanning because the image quality deteriorates. The default scale value is 100%.

Data Format

The data format specifies the number of bits used to represent the tone of a pixel. The data format can be set in the range of 1 bit to 8 bits per pixel per color.

As the value increases, more tones and colors can be captured in the scanned image. In monochrome, 1 bit/pixel (bi-level data) can represent only two levels of tones, black (0) or white (1). With 2 bits/pixel (quad-level data), four levels of tones can be represented by the binary values of 00, 01, 10 and 11. Using 8 bits/pixel corresponds to 256 shades of gray, producing near photographic quality results.

In color, the data format defines tones for each of the three primary colors of green, red, and blue. One bit/pixel/color can represent eight colors ($2 \times 2 \times 2$), and 2 bits/pixel/color can represent 64 colors ($4 \times 4 \times 4$). Eight bits/pixel/color (total 24 bits for a pixel) can represent over 16 million colors.

The scanner can read up to 12 bits/pixel/color. Above 8 bits/pixel/color the scanner converts the image data to 8 bits/pixel/color and sends it to the computer. This gives much higher quality.

Data format	Monochrome	Color
1 bit/pixel/color	2 grays	8 colors
2 bits/pixel/color	4 grays	64 colors
3 bits/pixel/color	8 grays	512 colors
4 bits/pixel/color	16 grays	4,096 colors
5 bits/pixel/color	32 grays	32,768 colors
6 bits/pixel/color	64 grays	262,144 colors
7 bits/pixel/color	128 grays	2,097,152 colors
8 bits/pixel/color	256 grays	16,777,216 colors

8 bits 2 bits 1 bit

To reproduce an image of more than 2 bits/pixel/color the output device should be capable of producing the same tones. Many displays and printers cannot do this and are limited to monochrome without gradations, or to 8 or 16 or 256 colors.

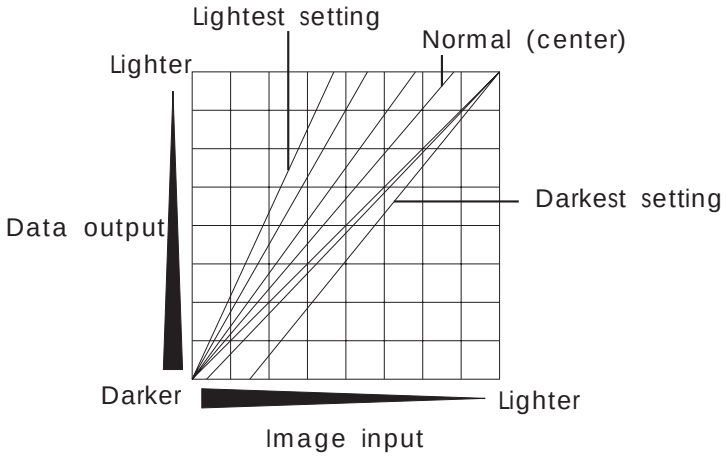
The data format chosen also affects the amount of data necessary for scanning and storing an image. The larger the bits per pixel value chosen, the larger the amount of image data becomes.

Brightness

You can choose one of seven brightness levels for scanning. Medium is the normal setting.

It is better to use darker settings for line art or faint original images, and to use lighter settings for darker original images. The brightness can be combined with any other function.

The graph below shows the differences between the brightness settings when the gamma correction is set for the CRT Display A setting.



Color Mode

The color mode specifies color reading or monochrome reading. In color reading, you can choose either page sequence reading or line sequence reading. In monochrome reading, you can specify a dropout color (green, red, or blue).

- *Color page sequence reading*
  The scanner scans the document three times (one each for green, red, and blue), and produces three pages of image data that combine to give full color image data. Since the image data can be divided into three sets, a computer with limited memory or processing speed can handle it more easily.

- *Color line sequence reading*
  The scanner scans the document with one pass of the carriage, reading green, red, and blue for every line. This yields more accurate color separation. Because the color for each pixel can be determined as soon as it is read, the color correction function can be used.

- *Monochrome reading (standard)*
  The scanner scans the same way as in the color line sequence reading until information is stored into image memory. Then the scanner makes the monochrome image data from three primary color image data by using the control circuitry.

- *Dropout colors (monochrome reading only)*
  The dropout color is the color you tell the scanner not to read. You can choose green, red or blue for the dropout color. Use a dropout color when you do not want to read one of these colors—for example, when scanning an image on a colored background.

Halftoning Mode

Halftoning is a process of changing an image to a pattern of dots. This is required because a printing press produces images in a different way than photography does.

Photographs have an almost infinite number of tones, with an almost infinite number of colors for color photographs, but printing uses only individual single-color dots. Black and white images use black dots, and color images use only four colors of dots: cyan (blue-green), magenta, yellow, and black. The size and spacing of these dots is varied to simulate photographic continuous tones. In some halftoning, the dots are quite noticeable. If the dots are fine enough, however, the printed image appears to have continuous tones.

You can choose various types of halftoning at the time you scan, but it is nearly always best to choose the halftoning setting "off" or "none" and have the halftoning done by the image editing software or by the output device (such as a laser printer).

You will always get better results scanning from a photograph than from a printed image, such as a picture in a newspaper or magazine, because printed images have already been halftoned and you may see a conflict in the halftone methods.

You can select from three types of halftoning, as well as enable or disable the halftoning process itself. When halftoning is disabled, the tones that the data can represent are determined by the data format. Halftoning is not available when 3 bits/pixel/color or more are selected as the data format, since halftoning is not necessary for such data. Halftoning modes B and C are not available with color line sequence reading.

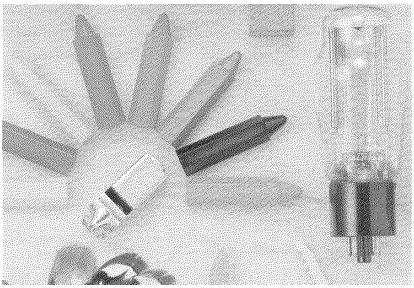
Your scanner also provides four typical dither patterns for 1- or 2-bits/pixel/color data format. With suitable software, you can define two more dither patterns.

Note:
Usually your scanner software or printing method can perform the halftoning. Therefore, you should usually not use halftoning or dither patterns when you scan.

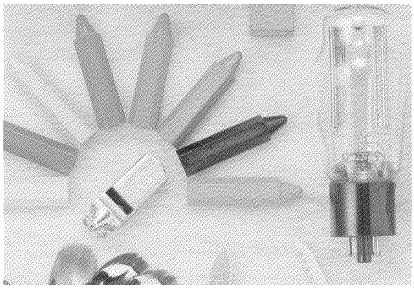
- *Halftoning mode A*
  This is the standard halftoning mode. The image is converted into a hard tone to produce a distinct image, and is suitable for most purposes. (1 and 2 bits/pixel/color)

- *Halftoning mode B*
  With this mode, the image is converted into a softer tone. This mode is suited for images which contain large areas of similar tones. (1 bit/pixel/color)

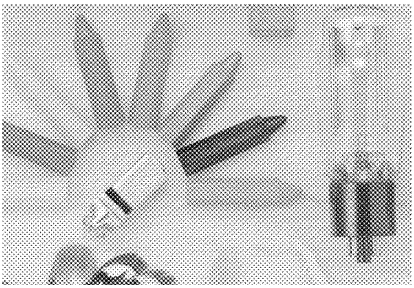
- *Halftoning mode C*
  With this mode, the image is represented in a way similar to the screen commonly used for newspaper photographs. The gradations of the tones are represented by clusters of different numbers of dots. (1 bit/pixel/color)



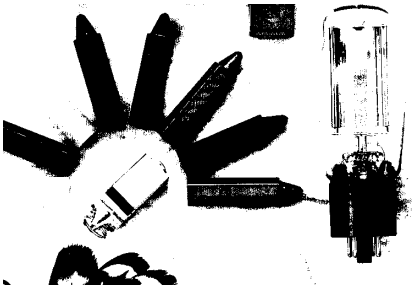
Halftoning mode A



Halftoning mode B



Halftoning mode C



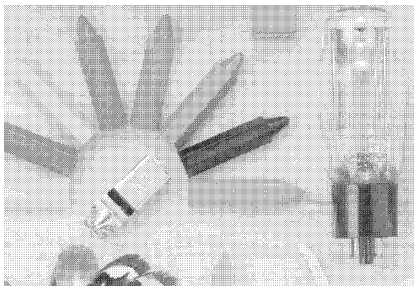
None

- *Dither pattern A*
  Halftone is expressed in 4 by 4 bayer dither pattern.

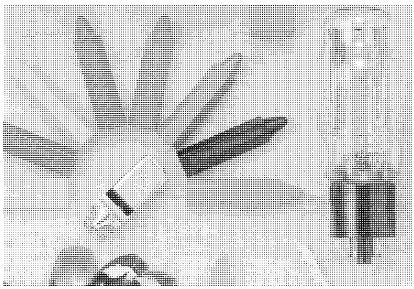
- *Dither pattern B*
  Halftone is expressed in 4 by 4 spiral pattern.

- *Dither pattern C*
  Halftone is expressed in 4 by 4 net screen dither pattern.

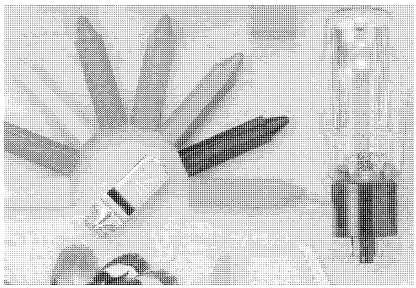
- *Dither pattern D*
  Halftone is expressed in 8 by 8 net screen dither pattern.



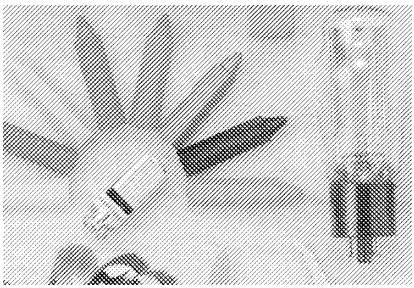
Dither pattern A



Dither pattern B



Dither pattern C

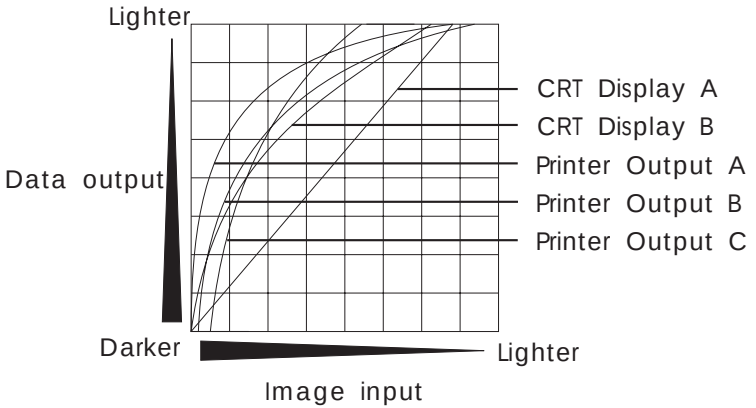


Dither pattern D

Note:
Changing the size of a halftone-processed image with your application software may degrade the image. Instead use the scanner's scale function at the time of scanning to select your desired image size.

Gamma Correction

Gamma, or tone, correction, adjusts the light intensity ratio between the original image and the output data. It brings out more detail in areas of both highlight and shadow. When the image is reproduced on certain types of output devices, the tones of the image will be closer to those of the original. The term "gamma" (γ) means the shape and slant of the line on the graph that shows the ratio, as shown below.



Gamma correction provides five settings, and can be combined with all other scanner functions. Choose an appropriate setting from the five modes below.

❏ *CRT Display A*
The output data is in proportion to the original image, as shown in the above graph. This setting is suited for most types of computer displays which can display an image in 1-bit/pixel/color format. This mode is also suited for images without continuous tones, such as line art (γ = 1).

- *CRT Display B*
  This setting is suited for analog-input CRT displays which can display an image with multiple levels of tones of more than 1 bit/pixel/color ($\gamma = 1.8$). This is usually the best setting.

- *Printer Output A*
  This setting is suitable for high-density printers, such as 24-dot printers and some page printers. The image is converted into a lighter image to compensate for the higher (darker) density of such printers. The image looks faint when viewed on a CRT display.

- *Printer Output B*
  This setting is suitable for low-density printers, such as 8-dot (9-pin) printers, and page printers. The image is converted into a slightly darker image to compensate for the lower (lighter) density of such printers. The image looks faint when viewed on a CRT display.

- *Printer Output C*
  This setting is suitable for high contrast printing of images which contain both picture and text. This setting gives higher contrast and more definition than either Printer Output A or B. The dark and light parts of images are accentuated by this method.

Color Correction

Color correction is functional only with color line sequence mode, because the color of a pixel is immediately determined when the pixel is scanned. Color correction provides four settings. To disable this function, simply choose color page sequence reading or monochrome reading.

This function processes the image data so that the data will be most suited for the characteristics of the color output device used.

- *CRT displays*
  This setting compensates colors for the characteristics of color CRT displays.

- *Impact dot-matrix printers*
  This setting compensates colors for the characteristics of impact dot-matrix color printers.

- *Thermal transfer printers*
  This setting compensates colors for the characteristics of thermal transfer color printers.

- *Inkjet printers*
  This setting compensates colors for the characteristics of inkjet color printers.

Scanner Setting Guidelines

This overview of scanner settings will give you a little background for using your scanning software. The messages on the screen and your software manual should be your main guide to scanning, but this section can supplement your understanding of your software's on-screen menus.

Each ✔ icon indicates a setting that you make or check. The first two are the most important.

Note:
Your software may use a somewhat different order or slightly different terminology.

✔ Image Type or Mode

For the best and most efficient scans, you need to know which type of images you are scanning: drawings, black and white photographs, or color photographs. The corresponding terms used by scanning software are line art, grayscale, and color.

- ❏ *Line art*
  This is the setting for drawings, including all drawings or pictures made up of black and white only, with no gray tones.

- ❏ *Grayscale* (also called monochrome or continuous tone)
  This is the setting for black and white photographs and drawings with various shades of gray in addition to black and white. You can also use this setting for color photographs that will be printed in black and white.

- ❏ *Color*
  This is the setting for color photographs or other originals in color.

Note:
Scans from photographs are better than scans from published images, such as newspaper or magazine pictures, because of halftoning conflicts. Use photographs instead of published images for experimenting with your scanner.

✔ Resolution

The best resolution setting depends on the image type or mode (line art, grayscale, or color) and the printing method. Read "Printing or display methods" and "File size" below; then use the table on page B-16 to find the resolution you should use.

Printing or display methods

The best resolution to use depends on what type of output or printing method you will be using. The usual printing methods for scanned images fall into the following categories:

- ❏ *Black and white printers* (laser, inkjet, or dot matrix) are good to excellent for text and line art but are not as good for grayscale images. These printers can be used for reproducing photographs in documents like newsletters that do not require the highest quality.

- ❏ *Electronic color printers* use laser, ink jet, or other technologies to produce color or grayscale images that range from coarsely patterned to nearly photographic (often called continuous tone) quality. It is best to see samples from a color printer before you decide to use it. These printers are usually used for small quantities of color images or for preliminary proofs of images that will be printed on a printing press.

- ❏ *Printing presses* are for high quality and high volume work. You scan and edit your images and then send the files to a service bureau or printing company, which uses high resolution phototypesetters (also called imagesetters) for high quality text and grayscale images. For full-color images, you scan in color and then use your image editing software to manipulate the image and produce color separation files. If you plan to do this, see the guidelines below on resolution and then follow the instructions in your software manual for making separations. Your service bureau or printing company should also provide helpful information.

- *Computer screens* require lower resolutions than most printers. If your scanned image will be viewed only on a computer monitor or screen and will never be printed, you can use lower scanning resolutions for top-quality work. Remember that the scanner can read and save up to 16 million colors. If your computer can display only 16 or 256 colors, you will not be able to see all of the quality of the scanned image.

File size

In grayscale and color, use the lowest resolution that gives acceptable quality for your printing or display method, because high resolutions mean large files. An A4 or letter-size full-color scan at 300 dpi uses as much as 25 megabytes (MB) of disk space.

Large files use up your computer and hard disk memory; they take longer to process, to print, or to transmit by modem; and they are more difficult to save to a disk for sending to a service bureau or printing company.

Many printing methods cannot use all of the information stored in a high-resolution scan, so in these cases part of the information is wasted.

Resolution guidelines

The table below shows the recommended resolutions in dots per inch or pixels per inch for the image types and printing or display methods just described. Also, you may want to experiment with your scanner settings, possibly using a cropped version of your image to save time, until you achieve the desired results.

The resolution that you use to scan an image (input resolution) does not have to match the dots per inch of your printer (output resolution). Input and output resolution are two quite different measurements. Just follow the guidelines below.

Optimum scanning resolutions

Output device	Line art	Grayscale	Color
Monochrome printer	300-600	80-170	—
Desktop or office color printer	300-720	150-240	150-240
Printing press or imagesetter	600-1200	150-350	150-350
Computer Screen	72	72	72

Here's how to calculate more precisely the required resolution for grayscale or color on an electronic color printer or a printing press:

1. Find out the lines per inch of the printing method. This is the measurement of resolution for high quality image printing. Do not confuse it with dots per inch, which is not an equivalent measurement.

2. Multiply the lines per inch by two to find the best scanning resolution. For example, for 175 lines per inch (a common resolution for magazines and books), scan your image at 350 dpi ($2 \times 175 = 350$).

For even smaller file sizes, try scanning at about 1.5 times the lines per inch. This may cause little or no perceptible loss of output quality.

Note:
For color or grayscale images, ignore the dpi (dots per inch) of your printing device. Even though your service bureau may use an imagesetter with a 2400 dpi resolution, a scan resolution of only 150 to 350 dpi will produce the highest quality grayscale or color images the imagesetter can print. Similarly, even though your laser printer may have a 300 dpi resolution, a scan resolution of only 80 to 110 dpi gives the best quality grayscale images it can print.

✔ Size or Scale

This is usually expressed as a percentage. If you want your printed image to be larger than the original, increase its size with this setting. If you are not sure how large you want the printed image, choose the largest size you might use. You can reduce the image size later with your software. (You can also increase the size with your software, but you may lose some quality.)

Note:
The size of the image on your monitor will probably be different from the size of the image when you print it.

✔ Halftoning and Dropout

For nearly all uses, None is the best setting for these. If you have special needs that require halftoning at the time of scanning, see the technical information on halftoning, dithering, and dropout earlier in this appendix.

✔ Brightness

The minus numbers lighten the image, the plus numbers darken the image. To lighten a dark original use -1 to -3, or to darken a light original use +1 to +3. Usually you should leave this setting at zero.

✔ Color Correction

Use the default or CRT display.

✔ Gamma Correction

Use the default or CRT Display B.

Note:
Your software may have different settings for Brightness, Color correction, and Gamma correction.

✔ Cropping

If you know you are going to use only part of an original, use your software's cropping tools before you scan (if possible) to select only the part of the image that you will use. This will make your image file smaller.

Judging Image Quality

When you look at your monitor to evaluate a scanned image, remember that the image will look different when it is printed. A monitor is a comparatively low resolution device; some images that look good on a monitor do not look as good when printed and vice versa. Keep in mind the final output device as you choose settings and manipulate the image.

In addition, each output device may produce different results. A proof printed on an electronic color printer will look different from the same image printed on a printing press.

Equipment

Your present equipment may be sufficient for your scanning needs, but if you are not satisfied with the quality of the images on your monitor or with the speed of image processing, read this section. While it does not contain specific recommendations, it describes various possibilities for improving your scanning system. For further information, see your dealer or an experienced scanner user.

RAM and hard disk size

Scanned images can use much more memory than text files, so you may need more Random Access Memory (RAM) in your computer and a larger hard disk than you have used previously.

Accelerator boards and CPU upgrades

In addition to memory, processing speed is important because large files take longer to process than small ones. Therefore, you may want to add an accelerator board to your computer, or upgrade your CPU.

Video cards

A video card that is sufficient for text may not be good enough for displaying graphic images, especially in color. If all your scanned images look coarse on your monitor, you may want to upgrade your video card. You will need 24-bit color, also called true color or millions of colors, for the best display of images.

Monitors

The resolution of your monitor, of course, also affects the quality of the image you see. Consider a high resolution monitor if you do precise color work, but first be sure you have the right video card.

File compression software

Many different programs are available to make image files smaller for storage or transmission. For example, they can enable you to store a 3MB image file on a floppy disk. Some compression software can compress images and restore them with no loss of data or quality; others compress images more, but the restored file is not exactly the same as the original. The difference between the original and restored files is, however, not always noticeable.

Icon Glossary

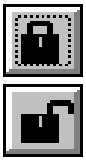
This glossary describes the TWAIN icons. If you want to know what a specific icon does, locate the icon in this glossary; then read its description. Some icons open dialog boxes which contain more icons.

Clicking a comparison icon displays three or five samples with different settings in the preview window. To choose a sample, click the one that most closely reflects the image you want. That sample is selected and placed in the middle position, and a different set of samples is displayed based on the image you selected. You can keep selecting the image you like best until you are satisfied with the one in the middle. Then double-click it, and it reappears alone. See "Modifying the TWAIN Configuration" in Chapter 4 for more information about displaying comparison samples.

TWAIN Advanced Screen Icons

Preview. Shows you your entire image before you scan it. Once an image is in the preview window, you can check its width, height, and file size on the screen. Previewing also allows you to see the effects of changes you make to your image.

Zoom Preview. Shows a specific area of an image in the preview window. Use the mouse to select the part of the image you want to preview.



Lock and **Unlock.** Locks or unlocks the current width, height, or scale settings for an image. The default setting is unlock.

Image Controls. Opens the Image Controls dialog box, which contains the options described under "Image Controls Icons" on page 3 of this glossary.

Tone Correction. Opens the Tone Correction dialog box, which contains options for adjusting tone levels when you want to alter the midtones, highlights, and shadows in an image. This lets you more accurately modify an image to reflect the tones in the original and bring out the details in shadow areas.

Color Adjustment. Opens the Color Adjustment dialog box, which lets you adjust colors in an image using the options described "Color Adjustment Icons" on page 4 of this glossary.

Invert. Changes negative images into positive images, or positive images into negative images.

Auto Exposure. Automatically sets the Highlight and Shadow settings in the Image Controls dialog box.

Auto Locate. Automatically locates and selects just the target image in the preview window. If your preview window contains more than one image and you only need one, roughly select the image you want by dragging the mouse pointer and clicking the Auto Locate icon.

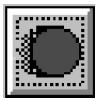
Image Controls Icons

Exposure Comparison. Allows you to compare three or five image samples of varying brightness. The middle sample reflects the current exposure setting.

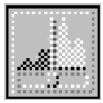
Gamma Comparison. Allows you to compare three or five image samples with different gradations between highlights and shadows. The middle sample reflects the current gamma setting.

Highlight Comparison. Allows you to compare three or five image samples of varying highlight intensity or color. The middle sample reflects the current highlight setting.

Shadow Comparison. Allows you to compare three or five image samples of varying shadow intensity or color. The middle sample reflects the current shadow setting.



Sharpness Comparison. Allows you to compare three or five image samples of varying sharpness. The middle sample reflects the current sharpness setting.



Threshold Comparison. Allows you to compare three or five image samples with different points at which the gray values change to either black or white. The middle sample reflects the current threshold setting. This option is available only when the Pixel Depth setting is Black & White and the Halftone setting is None in the Image Type dialog box. When the threshold option is available, the other image control options are not available.

Color Adjustment Icons

Gray Balance Comparison. Allows you to compare three or five varying casts of gray in image samples so you can select the most neutral gray.

Saturation Comparison. Allows you to compare three or five image samples of varying color saturations so you can select the paleness or richness of a color in an image. Three-pass scanning ignores saturation settings.

Color Filter Comparison. Allows you to compare three or five image samples of varying colors so you can select the specific color effect you want in an image. Three-pass scanning ignores color filter settings.

Term Glossary

Application Program
A software program designed to perform a specific task, such as word processing, image editing, or spreadsheet functions.

Additive Primary Colors
Primary colors that produce white when mixed in a certain proportion. These are red, green, and blue.

AAS
Automatic area segmentation. A feature that separates text from graphics so that grayscale images are clearer and text recognition is more accurate.

Automatic Document Feeder
A scanner accessory that automatically feeds a stack of paper into the scanner.

Best & de-screening
An EPSON TWAIN setting that produces the best quality scan and, on some scanners, removes unwanted moire patterns from scanned images.

Bi-level Data
Image data that is composed of 1 bit/pixel. A pixel is represented by a single bit of digital data that can express only 1 (light) or 0 (dark).

Bidirectional Parallel Interface
An interface for communicating between the computer and the scanner.

Bit/pixel
The unit to indicate the number of bits allocated for a pixel. The larger the value, the more detail of a pixel is represented.

Brightness
The amount of black or white mixed with a color.

Byte
A unit of information consisting of eight bits. A byte can represent a control code or character.

Calibration
A process that adjusts the color or black and white values in the scanned image file to compensate for the effects that software programs, printers, and monitors have on the image. Calibration produces a final output that more closely reflects the original.

Carriage
A component of the scanner that contains the optical sensor and light source for scanning.

Color Correction
A method of adjusting the color image data for a particular type of device so that the reproduction results are close to the original colors.

Color Filter
An EPSON TWAIN option that lets you modify the color of an entire image.

Color Separation
A process to convert full-color images into a limited number of primary colors. The additive primary colors (red, green, and blue) are used by the scanner and the subtractive primary colors (cyan, magenta, and yellow) plus black are used for printing press separations.

Contrast
The range between the darkest and lightest shades in an image.

Destination
A set of resolution and calibration settings that match the characteristics of the scan to the final output device. EPSON TWAIN provides several predefined Destination settings that allow you to adjust your scanned image to suit the output device you intend to use. You can also define your own Destination settings.

Device
A piece of computer equipment that performs a specific task, such as a disk drive, a monitor, a printer, or a scanner. Also called a peripheral.

Device Driver
A file containing instructions that allow your computer to recognize and control a device (such as a monitor, printer, or scanner).

DIB
Device-Independent Bitmap. A graphics file format for Windows version 3.0 or later. Four-bit/pixel images can be exported with RLE4 compression and 8-bit/pixel images can be exported with RLE8 compression.

Dithering
A process in which software or an output device simulates continuous tones with repeating patterns of dots.

DPI
Dots per inch. A unit of measurement for resolution. The higher the value, the higher (finer) the resolution.

Draft & fast
An EPSON TWAIN setting that provides faster scanning at a lower resolution.

Dropout
An EPSON TWAIN option that lets you instruct your scanner to ignore a color.

EPSF
Encapsulated PostScript File. An industry-standard file format supported by most applications.

ESC/I
Abbreviation for EPSON Standard Code for Image scanners. A system of commands to control image scanners with software.

ESC/P
Abbreviation for EPSON Standard Code for Printers. A system of commands to control printers with software.

Exposure
An EPSON TWAIN option that sets the intensity of light in an image.

File Format
The manner in which a graphic image is stored on the disk.

Gamma
An EPSON TWAIN option that sets the gradation between highlights and shadows in an image.

Gray Balance
An EPSON TWAIN option that lets you adjust the grayness of any area of an image. You can remove color casts and discoloration to make the grays in an image more neutral.

Grayscale
The measure of grayness of any area of an image. When an image is scanned, the gray level of each pixel is determined.

Halftone
An image type which simulates grayscale by varying the sizes of the dots printed.

Halftoning
A process of converting continuous tones into digital data so that the output data simulates the tones.

Highlight
An EPSON TWAIN option that lets you adjust the lightest portions of an image. The range between highlight and shadow determines the range and the color differentiation of the image.

Home Position
The position at the back of the scanner where its carriage rests before a scanning operation.

Image Type
The way an image will be scanned or reproduced. EPSON TWAIN provides Pixel Depth, Halftone, Dropout, Quality, Scanning Sequence, and Black and White options to adjust the scanned image you are creating. You can also define your own image type settings.

Imagesetter
A device that uses computer files to produce high-resolution text and graphics output on film or paper. These are usually found in service bureaus and printing companies.

Impact Printer
A printer that transfers ink onto the paper by striking the inked ribbon with a number of small pins.

Ink Jet Printer
A printer that transfers ink onto the paper by spraying it through a number of small nozzles.

Interface
The connection between or among computer devices.

JPEG
Joint Photographic Experts Group. JPEG is the standard file format for Lossy data compression and is supported by many applications.

Line Art
A black-and-white image made up of lines and solids with no grays.

Line Sequence
A type of color scanning that separates primary colors line by line. The carriage makes only one pass.

Lossy
A data compression system that intentionally discards (or loses) some data from the original image.

Midtone
The tonal value of a dot, located approximately halfway between the highlight value and the shadow value.

Moiré
An unwanted interference pattern that can occur when a halftone image is scanned or when it is scaled in an application after it has been scanned.

Monochrome
Black and white images, or images represented only by the intensity of luminosity.

Page Sequence
A type of color scanning in which the entire image is scanned once for each separation color. The carriage makes three passes.

Path
The directory and subdirectories you specify to locate a file. For example, the path for the TWAIN directory in Windows may be C:\WINDOWS\TWAIN.

PCX
PC Paintbrush file format.

Pixel
Picture Element. Each image is composed of a number of pixels. Pixels are sometimes called dots.

Pixel Depth
An EPSON TWAIN setting that lets you select the amount of color information in a file.

Plain Bi-level
Bi-level image data without the halftoning process.

Port
An interface channel through which data is transmitted between devices.

Resolution
Indication of how finely an image is resolved into pixels. Measured in dots per inch (dpi), pixels per inch (ppi), or sometimes samples per inch (spi).

RLE Compression
Run-Length Encoding. A type of data compression.

Saturation
The amount of color in a specific hue. Unsaturated colors tend to be pale. Saturated colors tend to be rich and vibrant.

Scaling
Reducing or increasing the size of an image.

Scan
An operation performed by the sensor and the carriage of a scanner. Scanning divides the image into pixels.

Scanning Area
The physical size of the image that can be scanned by the scanner.

SCSI
Small Computer System Interface. EPSON scanners may use the Adaptec AHA-1510 SCSI host adapter card or any other ASPI-compliant adapter card to communicate between the computer and the scanner.

Shadow
An EPSON TWAIN option that lets you adjust the darkest areas of an image. The range between highlight and shadow determines the range and the color differentiation of the image.

Sharpness
An EPSON TWAIN option that lets you adjust the measure of enhanced detail (focus) in an image.

Subtractive Primary Colors
Primary colors that produce black when mixed in a certain proportion. These are cyan, magenta, and yellow. In printing, black is often added to give more definition because mixing of actual inks cannot produce pure black.

TET
Text enhancement technology. A feature that eliminates the document background and raises the recognition accuracy during OCR (Optical Character Recognition) scanning.

Threshold
An EPSON TWAIN option that sets the point at which gray values are changed to either black or white.

TIFF5.0
Tagged Image File Format, version 5.0. TIFF is an industry-standard file format supported by many applications. Black-and-white images can be exported with G3 compression.

TIFF6.0(JPEG)
Tagged Image File Format, version 6.0 with JPEG compression. TIFF and JPEG are industry-standard file formats supported by many applications.

Tone Correction
A method of adjusting the transfer curve so that the reproduction results on different types of output devices have tonal gradations similar to the original image.

Transfer Curve
A tone correction graph that shows the contrast ratio between the input (original image) and output (image data) in image processing.

Transparency Unit
A scanner accessory which allows the scanner to use materials such as transparencies and slides.

TWAIN
An open industry interface allowing you to acquire image data directly from external sources without leaving your current application.

Zoom
The ability to enlarge a portion of an image.

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